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History of the Department of Pathology and Immunology and Its Divisions, Washington University School of Medicine.

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**History of the Department of
Pathology and Immunology and Its
Divisions
Washington University School of
Medicine**

**Jack Ladenson
July, 2021**

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History of the Department of Pathology and Immunology

INTRODUCTION

This is a written version of a talk I gave at the virtual Pathology and Immunology department retreat on October 31, 2020. The information gathered was based on internet searches, Washington University on-line information via the Becker library archives, which includes Digital Commons, Medical School Bulletins which date from the 19th century, Washington University Magazine, 1950s and up; Washington University Record 1970s and up; Washington University Medical Alumni Quarterly 1937-1951; Outlook Magazine 1960s and up; Jewish Hospital Newsletter 1950s-1980s; Jewish Hospital Record 1970s and up; Barnes Hospital Bulletins 1960s-1990s; Barnes Hospital Record 1940s-1960s; transcripts of oral histories, information from The Source, as well as material not on-line courtesy of Stephen Logsdon, Archivist for the Becker Library. In addition, I reviewed the history of the clinical laboratories compiled by Mitch Scott (<https://pathology.wustl.edu/about/history/>) and a book chapter on Surgical Pathology at Barnes Hospital sent to me by Pepper Dehner. Some of the dates utilized may be off by a year or so as the Medical School Bulletins reflect faculty as of a variable yearly cut-off date. I have included as Appendix 3, the source of all images used.

This project was started during the COVID-19 pandemic of 2020-21 and I decided to create a written version on-line with the sources noted so that those in the future do not have to completely repeat the lengthy research up to this time.

I thank Pepper Dehner, Stephen A. Logsdon, Paul Schoening, Phil Skroska and Mitch Scott for the material they made available and Ann Winn for her patience and perseverance with my poor handwriting and the multiple drafts that fact checking involved. I also thank Steve Teitelbaum, Emil Unanue and Bob Schmidt for their helpful suggestions. I thank my wife Ruth, for everything.

The modern history of the Pathology and Bacteriology department (as it was originally called) begins with the reorganization of the Washington University Medical School in 1910 following the Flexner Report. The medical school was founded as the Washington University Medical Department in 1891 when the faculty of the St. Louis Medical College affiliated with Washington University. In 1899 the Missouri Medical College merged with the medical department. (<http://beckerexhibits.wustl.edu/wusm-hist/roots/index.htm>). In 1904, the Washington University Hospital began seeing patients in the building that had been the Missouri Medical College in downtown St. Louis. This was the principal teaching facility until Barnes and St. Louis Children's hospitals opened near the medical school in 1914; Children's relocated from Jefferson Avenue, and the activities of the Washington University Hospital folded into the newly created Barnes Hospital. The opening of the new medical school and hospital campus was celebrated on April 28-30, 1915. A history of the medical center is shown in Table 1. The reorganization of the medical department in 1910 by Robert Somers Brookings (1850-1932), Chairman of the Corporation of Washington University (now the Board of Trustees) was directly related to a critical assessment and report by Alexander Flexner in 1910.

FLEXNER REPORT

The lead up to the Flexner Report (Medical Education in the United States and Canada – Bulletin #4) (Appendix 1: <http://archive.carnegiefoundation.org/publications/medical-education-united-states-and-canada-bulletin-number-four-flexner-report.html>) involved a number of factors occurring primarily after the U.S. Civil War (Table 2). Most of the medical schools at that time were proprietary and not associated with universities, as was true for the Washington University School of Medicine's predecessor institutions before 1891. Such schools generally had part-time faculty and were lecture-only with little feedback concerning actual student learning, again similar to Washington University medical school before 1910. There were some efforts to "evolve the curriculum" notably at Harvard, Yale and the University of Michigan. There were also scientific

advances related to medicine such as the germ theory and vaccination by Koch, Pasteur, Ehrlich and others (in 1885, Pasteur successfully vaccinated Joseph Meister for rabies).

A proliferation of physicians had helped lead to a resurgence of state licensing of physicians in the 1870s. Such licensing had greatly diminished during the Jacksonian era (1828-1840) related in part to a skeptical view of “experts” whose often harsh treatments such as bleeding, blistering, purging, vomiting and sweating were challenged by a minimized approach of fresh air, diet, and herbal treatments as well as a general anti-regulatory political climate. Johns Hopkins opened a new medical school based on a different mode of teaching (Table 3A) in 1893. It was staffed by a full-time academic medical faculty, unlike the majority of medical schools, including Washington University’s, before 1910. Philanthropic efforts by Andrew Carnegie and John D. Rockefeller were started a bit later. These appear to not have been in concert and might have even been a bit competitive. The AMA Council on Medical Education (CME) had created and published a classification and general ranking of medical schools by 1907 but without individual school ratings. Their reports had generated some backlash concerning the CME’s impartiality as it was AMA sponsored, and the council decided to seek Carnegie Foundation involvement. (Berliner HS. Reference in Selected References (p 12): <https://www.jstor.org/stable/44450471>). The Carnegie Foundation authorized a study in November 1908.

Table 2 shows some of the various efforts and organizations that were evolving for medical education reform; Table 3A-E shows some details for the organizations involved, Johns Hopkins Medical School, the General Education Board, Council on Medical Education (CME), Carnegie Foundation for the Advancement of Teaching, and the Federation of State Medical Boards. Table 4A-E shows individuals known to be related to the report by Abraham Flexner; Arthur Bevan of CME, Henry Pritchett of the Carnegie Foundation, who commissioned the report, William Welch of Johns Hopkins, an advisor, and Simon Fletcher, brother of Abraham, who had

been at Johns Hopkins, later Chair of Pathology at the University of Pennsylvania, and was then director of the Rockefeller Institute for Medical Research.

It is not certain how Abraham Flexner (Table 4A) came to the attention of Henry Pritchett (Table 4C). Perhaps randomly, as the Carnegie Foundation, originally founded to address pensions in education, was likely thinking of expanding its mandate. It is also likely that Pritchett would have been in contact with Abraham Flexner's brother Simon (Table 4E), then at Rockefeller, as well as William Welch (Table 4D) at Johns Hopkins. He certainly was in conversation with Bevan (Table 4B) at the AMA Council on Medical Education who had requested the study.

Abraham Flexner (1866-1959) (Table 4A) had founded a very successful college preparation school in Louisville, KY in 1890. After he sold it in 1905, he went to Harvard for a year and then visited some European universities. He published a book, *The American College*, in 1908, which was critical of American higher education which came to the attention of Pritchett, who commissioned him to do a study of medical education in North America, as had been requested by CME.

Flexner travelled (pre-airplane; nearly pre-automobile) to 155 medical schools in the U.S. and Canada between 1908 and 1910. The model utilized for a successful medical school was that of Johns Hopkins (Table 3A) and Flexner's trip was for the most part an on-site survey with recommendations to meet the new model. His report, *Medical Education in the United States and Canada Bulletin Number Four* (<http://archive.carnegiefoundation.org/publications/medical-education-united-states-and-canada-bulletin-number-four-flexner-report.html>) (Appendix 1) presented details for each of the medical schools he visited. This was different than the CME reports which did not identify individual schools nor project their prospects for the future. The Flexner report was critical and effective in accelerating the changes in medical education which were already occurring. By 1920 there were only 85 medical schools left in the U.S. and by 1923 only 66 remained.

Washington University's medical school was one of the 31 schools recommended for continuation in the published Flexner report. As regards schools in Missouri (Appendix 1, pp 251-259), Flexner writes, "Utterly wretched are: 1) Kansas City Hahnemann Medical College, 2) Central College of Osteopathy; 3) American School of Osteopathy; 4) St. Louis College of Physicians and Surgeons; 5) American Medical College; 6) Hippocratean College of Medicine. Feeble and without promise are: 7) Barnes Medical College; 8) Ensworth Medical College; and 9) University Medical College. The last named is distinctly superior to the other eight. There remain the two-year school conducted by the State University, the medical department of Washington University, and the St. Louis University School of Medicine."

When writing about the Washington University medical department, he writes, "It was completely reorganized on modern lines in 1910 and notes that all the laboratory branches, as well as the departments of medicine, surgery, and pediatrics, have been already reorganized on a strict university basis." (<http://beckerexhibits.wustl.edu/wusm-hist/growth/index.htm>). See Appendix 1 for a link to the Flexner's report and his complete comments regarding Missouri and St. Louis medical schools.

How Flexner's opinion of Washington University changed greatly between his first visit in April of 1909 and what he wrote in the published report will be discussed in a later section, Reorganization of the Medical School. Other aspects of the report outline the availability of co-educational medical schools and note decreasing numbers of female medical students attending and concludes opportunities for women have increased, not decreased, and it is not now necessary to endow separate medical schools for women (Chapter XIII, pp. 178-179).

In a separate chapter (Chapter XIV, pp. 180-181), Flexner also notes "the Negro must be educated not only for his sake, but for ours." He continues, "the pioneer work in educating the race to know and practice fundamental hygiene principles must be done largely by the Negro doctor and the Negro nurse." He says more on this theme and states, "A well-taught Negro sanitarian will be immensely useful; an essentially untrained Negro wearing an M.D. degree is

dangerous.” He goes on to recommend only two of the 7 medical schools for Negroes in the U.S. are worth developing: Meharry in Nashville and Howard in Washington.

The Flexner report and its influence has been written about extensively (see Selected References, pp. 11-12). It has been criticized for being redundant to the efforts of the CME. However it has much more detail on every school visited including individual recommendations for each, including closing the school for some. It was also independent of the AMA which gave it more credibility than the AMA sponsored CME as its recommendations did lead to a decrease in medical school graduates and a resulting increase in physician income.

The report has been criticized for being racist, which seems justified from the rationale presented for medical education for the Negro (see above). However, it did recommend two of the “black” medical schools for continued support; Meharry and Howard, which both continue today. It is worth noting that patients at Barnes Hospital were segregated until the 1960s even in the ward service.

The controversy over whether full-time or part-time faculty are best suited to teach medical students, and science versus “medical” curriculum discussed in the report continue today. Flexner recommends full-time faculty and the science approach but the opposite approach of part-time faculty and “medical” curriculum can still improve medical care in some environments, e.g., developing countries.

Selected References Concerning the Flexner Report:

KM Ludmerer. *Time to Heal: American Medical Education from the Turn of the Century to the Era of Managed Care* (N.Y. Oxford University Press. 1999)

Kenneth M. Ludmerer, Commentary: Understanding the Flexner Report. *Academic Medicine*; 2010; 85(2): 193-196.

https://journals.lww.com/academicmedicine/FullText/2010/02000/Commentary_Understanding_the_Flexner_Report.13.aspx

K. Ludmerer. *Learning to Heal: The Development of American Medical Education*. 1981. Basic Books. New York, NY.

TN Bonner. Searching for Abraham Flexner. *Acad Med* 1998; 73(2): 160-166.
https://journals.lww.com/academicmedicine/Abstract/1998/02000/Searching_for_Abraham_Flexner.14.aspx

LE Miller and RM Weiss. Revisiting Black Medical School Extinctions in the Flexner Era. *Journal of the History of Medicine*. 2011; 67(2): 217-243. <https://academic.oup.com/jhmas/article-abstract/67/2/217/799720?redirectedFrom=fulltext>

Lester S. King. XX. The Flexner Report of 1910 – A Scholarly Accomplishment. *JAMA* 1984; 251(8): 1079-1086. <https://jamanetwork.com.beckerproxy.wustl.edu/journals/jama/fullarticle/391639>

A. Rae. Osler Vindicated: The Ghost of Flexner Laid to Rest. *CMAJ* 2001; 164(13): 1860-1861.
<https://www.ncbi.nlm.nih.gov.beckerproxy.wustl.edu/pmc/articles/PMC81198/>

Charles Boelen. A new paradigm for medical schools a century after Flexner's report. *Bulletin of the World Health Organization* 2002; 80(7): 592-593.
<https://www.scielo.org/article/bwho/2002.v80n7/592-593/>

A. Flexner. Medical Education in America: Rethinking the Training of American Doctors. *The Atlantic*. June 1910 (Flexner's View):
<https://www.theatlantic.com/magazine/archive/1910/06/medical-education-in-america/306088/>

Donna Bingham Munger. Robert Brookings and The Flexner Report: A Case Study of the Reorganization of Medical Education. *J. Hist. Med. and Allied Sciences*. Oct. 1968; 23 (4): 356-371; (a former Archivist at WUSM library; she had full access to Wash U records):
<https://academic-oup-com.beckerproxy.wustl.edu/jhmas/article/XXIII/4/356/955919?login=true>

History in WUSM School of Medicine Bulletin 2015-6, pp. 5-7
https://digitalcommons.wustl.edu/med_bulletins/

Origins and History of the Washington University School of Medicine; Reorganization and Growth 1909-1929. <http://beckerexhibits.wustl.edu/wusm-hist/growth/index.htm>

Phoenix Rising. Washington University Outlook: <https://outlook.wustl.edu/2011/apr/phoenix/>

Andrew H. Beck. The Flexner Report and the Standardization of American Medical Education. *JAMA* 2004; 291(17): 2139-2140. <https://jamanetwork.com/journals/jama/article-abstract/198677>

Berliner HS. New Light on the Flexner Report: Notes on the AMA-Carnegie Foundation Background. *Bulletin of the History of Medicine*, WINTER, 1977, 51(4): 603-609:
<https://www.jstor.org/stable/44450471>.

The Flexner Report itself (see Appendix 1)

REORGANIZATION OF THE MEDICAL SCHOOL

Flexner came to visit Washington University on April 9, 1909 (see Munger reference in Selected References). Before he came, Henry Pritchett had told Flexner that he should expect to find better training at WUSM. Pritchett had been a faculty member at Washington University and knew the Chair of the Washington University Corporation, Robert Somers Brookings (Table 5) well. On his return from St. Louis, Flexner reported to Pritchett that the medical department was only “a little better than the worst but absolutely inadequate in every respect.” When Pritchett informed Brookings about Flexner’s prepublication review, Brookings told Pritchett that he had already increased the medical school budget and launched fund raising for new facilities. He went “posthaste” to New York to meet with Pritchett and Flexner. In May 1909, Flexner returned to St. Louis and toured the medical department with Brookings while pointing out the various deficiencies. After only a few hours, Brookings knew he had a real problem. Flexner recommended: 1) form a new faculty; 2) reorganize the clinical faculty; and 3) raise a large enough endowment to repeat the Hopkins experience. This latter recommendation relates to supporting full-time faculty. Brookings estimated that it would take 3 million dollars and quickly got Board approval and the medical school was placed under direct control of the Washington University Board of Directors.

It is obvious that Flexner changed his view of Washington University between his first report to Pritchett and the final published report. There was interaction between Flexner and Brookings in both New York and St. Louis. One can read into this, but the Flexner report appears designed to identify schools without hope and to make recommendations about the others that would set them on the path of the Hopkins model. Before he wrote the final report, Flexner knew of Brookings’ plans that already had Washington University Board approval. He also knew what Brookings had done to relocate and revamp the undergraduate school and therefore his credibility as regards the medical school.

The hunt for new faculty was started by Brookings and Chancellor David Houston advised by Pritchett, A. Flexner and David Linn Edsall, M.D. the prime candidate to be Dean. Three members of the Washington University Board of Directors, William Bixby, Adolphus Busch Sr. and Edward Mallinckrodt Sr. pledged money. At Christmas 1909, Edsall came to St. Louis and met with Brookings and Chancellor Houston at Brookings house on Lindell. Before Brookings left on a delayed foreign trip, he had himself pledged \$500,000 of the \$800,000 needed for the new facilities and the schools operating costs and gave Houston the okay to search for people. Brookings had also met with Harvey Cushing in St. Louis. Cushing elected to go to Harvard but helped to recruit new department chairs particularly Eugene Lindsay Opie in Pathology. Edsall and Cushing and others were recommended by A. Flexner and probably Welch and Simon Flexner as well. In October, 1913, Brookings learned that Johns Hopkins got \$2.5 million from the General Education Board (GEB, Table 3B) to support full-time clinical departments. In January 1914, Brookings applied for a grant from the GEB (A. Flexner, then Secretary) for full-time clinical faculty and got a matching grant for \$750,000 and by 1916 funds for endowing Medicine (John T. Milliken Department of Internal Medicine), Pediatrics (Edward Mallinckrodt Department of Pediatrics), and Surgery (Mary Culver Department of Surgery) were obtained. Around the time of the Flexner report, Brookings discussed with Barnes Hospital a formal affiliation with the new hospital being built with funds from the will of Robert A. Barnes.

The new Chairs of the reorganized medical school departments are shown in Table 6. All the Chairs of departments were new to the university except for Terry in Anatomy. George Dock was Dean for one year and then replaced by Opie, although Dock stayed as Medicine Chair until 1922. John Howland stayed for 6 months and Edsall for one year. The Chairs of the departments would make up the executive faculty and the Dean would be selected from the executive faculty. It was later modified in 1965 at WUSM to a full-time Dean and Morris Kenton (Ken) King served from 1965 to 1989 <https://beckerarchives.wustl.edu/king-m-kenton-morris-kenton>); Outlook Magazine, Winter 1989, pages 21-24:

<https://digitalcommons.wustl.edu/cgi/viewcontent.cgi?article=1095&context=outlook>,

<https://source.wustl.edu/2009/09/the-celebrated-deanship-of-m-kenton-king-md/>.

The history of the pathology and immunology department will be described via the history of its departmental Chairs, and the evolution of its Divisions.

Division Chiefs, notable faculty and ex-faculty are identified in the division of the department that they did or might have belonged to. There have been eight ex-faculty members who have received the Gold-Headed Cane Award for lifetime achievement from the American Society of Investigative Pathology (ASIP): 1986, Lauren Ackerman; 1987, Frank Dixon; 1990, Robert Stowell; 1995, Paul Lacy; 2000, Leonard Jarett; 2002, Joe Grisham; 2006, Mike Liberman; 2011, Jay McDonald. Six current or recent faculty with primary appointments in Pathology and Immunology are members of the National Academy of Sciences. The six members are: Marco Colonna, Jeff Gordon, Ken Murphy, Bob Schreiber, Emil Unanue, and Skip Virgin. Amongst award and prizes named for people from the department by WUSM (financial information from the School of Medicine WUSM Bulletin 2020-21) are the Steven Dressler Prize for a graduating student who has demonstrated a commitment to promoting social good, civil rights and civil liberties through social action and volunteerism, the Howard A. McCordock Book Prize in Pathology, and the Dr. Margaret G. Smith Award is given to a woman medical student for outstanding achievement in the second year of medical school. Distinguished Alumni Full-Tuition Scholarships to WUSM have been named for Louis P. Dehner, Deborah J. Gersell, John M, Kissane, Virgil Loeb, and Steve Teitelbaum. The Davie Family Endowed Scholarship (Joe Davie, Table 10I) supports scholarships for deserving medical students and the Hiromu Tsuchiya Scholarship fund provides scholarship support at WUSM.

CHAIRS OF PATHOLOGY

Like the rest of the other academic departments in 1912, the full-time faculty of the Department of Pathology and Bacteriology was small with only one full-professor who was Chair

of the department. There were sometimes over time one or more associate professors of sub-disciplines such as Associate Professor of Bacteriology. Temporary, generally training appointments as Assistant in or Associate in Pathology were also widely utilized and not considered faculty.

The total full-time faculty in the department started quite small; 4-7 until World War II when it went to ~20 with additional increases in the 1960's to ~30 and 1970's to ~60. Faculty growth is also noted in the list of Chairs of the department (Table 7). In 2019 there were 110 full-time faculty listed with primary appointments in Pathology and Immunology organized into 4 divisions: Anatomical and Molecular Pathology, Immunobiology, Laboratory and Genomic Medicine, and Neuropathology.

Tables 7A to 7L presents the background and additional information about the Chairs of Pathology, including Interim and Acting Chairs from 1910 to the present.

The first Chair of Pathology and Bacteriology after reorganization was Eugene Lindsey Opie, MD (Table 7A). Opie, 37 years old, was a student of William H. Welch, MD (1850-1934) (Table 4D) who was Chair of Pathology at Johns Hopkins School of Medicine, its first Dean, and a major advisor to the Carnegie Foundation and Abraham Flexner. Opie's father, Thomas was an OB/GYN and one of the founders and Dean of the University of Maryland College of Medicine in Baltimore. Opie studied pancreatic disease in his early career, helping to establish morphological changes in the Islets of Langerhans with diabetes and that gallstones obstructing the ampulla of Vater are a possible cause for acute pancreatitis. He shifted to the study of tuberculosis and immunity after WWI.

Leo Loeb, M.D. (Table 7B), came to St. Louis the same year as Opie as head of research at the then independent Barnard Free Skin and Cancer Hospital. He moved to the medical school in 1917 as Professor of Comparative Pathology, a department with no other faculty or defined medical school teaching responsibilities; clearly a research position. In 1925, Loeb became Chair

of the renamed Department of Pathology and a new department of Bacteriology and Public Health was created with Arthur Isaac Kendall, PhD, DrPH as Chair. Kendall had received the first PhD in Bacteriology from Johns Hopkins and one of the first PhD's in Public Health from Harvard. He then was the first Chair of Bacteriology at Northwestern and Dean there from 1916-1924. He stayed at Washington University three years then returned to Northwestern in 1927 as a research professor until his retirement. His successor, Jacques Jacob Bronfenbrenner, PhD, DrPH (1883-1953) (Table 10A) came to Washington University from Rockefeller to be Chair of the renamed Department of Bacteriology and Immunology, with laboratories in the West building. He was the 29th President of the American Association of Immunologists from 1942 to 1946 as elections for the 1-year term were suspended in 1943-1945 due to World War II.

In a review of the facilities and operations of the Department of Pathology in January, 1926 (ref: Leo Loeb, Washington University School of Medicine Department of Pathology. 1926. Division of Medical Education. The Rockefeller Foundation, not on-line, copy courtesy of Steve Logsdon, Archivist, Becker Library WUSM) Loeb gives the total budget for the Pathology department, which included all salaries and expenses including the autopsy service of Barnes and St. Louis Children's Hospital, as \$41,300.

Howard A. McCordock, M.D. (Table 7E) joined the faculty in 1928 and Margaret Gladys Smith, MD (Table 7D) in 1930. Both came from the Pathology department of Johns Hopkins University and both would have a significant role along with Bronfenbrenner in the 1930's in the investigation of an epidemic of what was called St. Louis encephalitis (Joseph F. Bredeck. The Story of the Epidemic of Encephalitis in St. Louis. Am J of Public Health.1933; 23(11): 1135-40: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1558406/pdf/amjphnation00935-0023.pdf>), and McCordock (https://digitalcommons.wustl.edu/med_alumni_quarterly/3/ pages 141-147). This epidemic came in two discrete phases, both with 20% mortality: one in 1933, ~1,000 cases, and the other in 1937, ~500 cases (see McCordock, Table 7C). This was felt by Margaret Smith (Margaret Smith, History of the Pathology Department, 1965, not on line) to be due to weather

conditions being just right those two summers; heavy rainfall in late spring, early summer, followed by little rain and high temperatures for a month, favoring the insect vector.

McCordock was assured around 1937 that he would become Chair of Pathology at WUSM after he received a similar offer from Ohio State (Margaret Smith, History of Pathology Department, 1965). He became Chair of Pathology on January 1, 1938 until his death on November 13, 1938 of rheumatic heart disease. Smith then became Acting Chair (she was the only other full-time academic faculty member) until Robert A. Moore, MD (Table 7E) arrived as Chair in 1939. Moore was also Dean from 1946 to 1954.

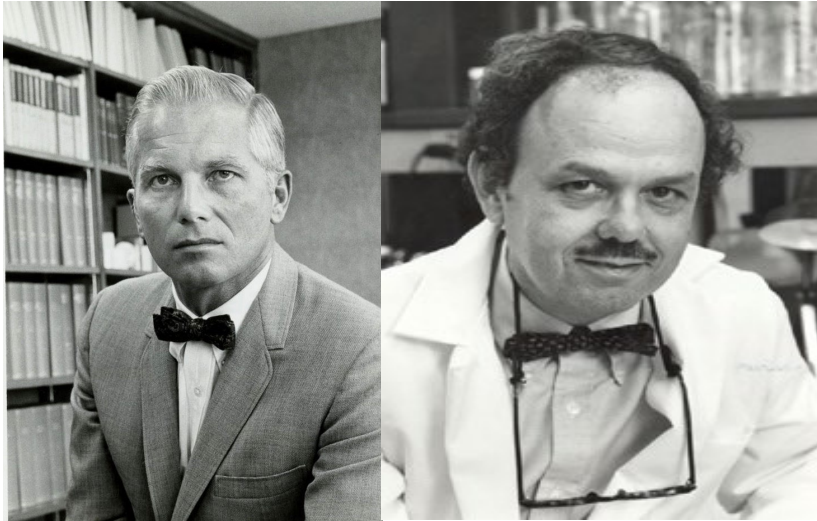
There was an expansion in the faculty following WWII (information on faculty from 1951-54 was not available in the on-line WashU Bulletins) and the department identified specialty areas by 1948 including Infectious Disease - Margaret Smith; Neuropathology – David English Smith, Surgical Pathology – Lauren Ackerman, and Clinical Pathology – Gustave Dammin. Also after the war, the Silberbergs joined the department; Martin in 1946 and Ruth by 1947 (Oral History Transcript – Ruth Silverberg):

http://beckerexhibits.wustl.edu/mowihsp/words/OHSilberberg_part1.htm)

Gustave Dammin (Table 7F), a self-described parasitologist, joined the Pathology and Medicine departments in 1947. He also headed the School of Medical Technology at Barnes Hospital and is the first clearly defined clinical pathologist by specialty interest starting in 1946. Dammin was named Interim Chair of Pathology, with the public expectation of his being named permanent Chair (Barnes Hospital Record, December 1950). However, he moved to Peter Bent Brigham in Boston at the end of 1951 as their Chair of Pathology.

Also in 1947, David English Smith, Jr., MD (1920-2017) (Table 9B), a neuropathologist, joined the faculty from 1947 until 1955. He was later Chair of Pathology at the University of Virginia.

From 1948 to 1950, Frank S. Dixon (Table 10C) was on the faculty and then left to be Chair of Pathology at Pittsburgh. He was later a founder of the Scripps Research Institute and a Lasker Award recipient in 1975, twenty years before Emil Unanue, a future Chair of Pathology at WUSM, who did postdoctoral training with him in San Diego, received the same award.



Frank J. Dixon
1975 Lasker Awardee

Emil R. Unanue
1995 Lasker Awardee

After Robert Moore left the University to be Vice-Chancellor at Pittsburgh in 1954, Walter Stanley Hartroft, MD, PhD (1916-1981) (Table 7G) became Chair until 1961 when he returned to Toronto. His resignation was possibly related to the “rift” between Barnes Hospital and WUSM at that time (see Division of Laboratory Medicine section).

In 1956, Sarah Amanda Luse, MD (1918-1971) (Table 9C) joined the faculty in both pathology and anatomy. Later Luse, a neuropathologist, was Acting Chair in Anatomy in 1964-5 (<http://beckerexhibits.wustl.edu/mowihsp/bios/luse.htm>). She went to Columbia University in 1968 as Professor of Anatomy and died a few years later.

Lauren Ackerman, MD (1905-1993) (Table 8A) joined the faculty in the Surgery department in 1948, and also as the Chief Surgical Pathologist at Barnes Hospital. It was

common then for surgical pathology to be considered a surgical subspecialty (see Surgical Pathology Division).

Paul Lacy, MD (1924-2005) (Table 7H), Chair of Pathology from 1961 to 1984, came to WUSM from the Mayo Clinic a year or two after Sarah Luse came from there, to also work in the anatomy department to learn electron microscopy. Lacy's research was dedicated to understanding and fixing diabetes. He developed methods to isolate and culture pancreatic islets for their use in transplantation. The first islet cell transplant in humans in 1989, that led to no insulin requirement, was done by Paul and Dave Sharp, a young faculty member in Surgery.

Lacy's years as Chair was another time of great expansion. The increasing complexities of modern medical concepts and techniques as well as the creation of Medicare, the expansion of government funding of research and training, and the Vietnam War all lead to an era of expansion and sub-specialization. The division system in 1969 had Ackerman in surgical pathology, Sarah Luse in Neuropathology and Leonard Jarett in Laboratory Medicine. These divisions will be discussed separately later. The number of faculty had grown to 74 and people such as: Fred Askin, Erica Crouch, Joe Davie, Gustave Davis, Pepper Dehner, Don Krogstad, Jack Ladenson, Mike Lieberman, Dick Lynch, Joe Marr, Jay McDonald, Jeff Milbrandt, Joe Miletich, Moon Nahm, James Smith Nelson, Juan Rosai, Jeff Saffitz, Sam Santoro, Carl Hugh Smith, Steve Teitelbaum, Richard Torack, John Turk, and Joe Williamson joined the department.

There was a small world link between Lacy and Bob Glaser (see Immunobiology, Table 10B). After Glaser left to be Dean at Colorado, he sold his home in Webster Groves to Paul. This home was host to a memorable annual Christmas party. Also, Glaser grew up in the University Hills section of University City and went to Flynn Park Elementary School where the children of current faculty members, Ladenson and Teitelbaum, went to school.

Emil Unanue (Table 7I) came from Harvard as Chair in 1985 until 2006, perhaps as compensation for Dammin's move to Brigham in 1951. There was another expansion of the

department with Paul Allen, Elizabeth Brunt, Andy Chan, Kyunghee Choi, Chuck Eby, Daved Fremont, Eric Green, Ann Gronowski, Cliff Harding, Jay Hess, Mike Holers, Peter Humphrey, Jonathan Katz, Robin Lorenz, John Lowe, Ken Murphy, Arie Perry, Jon Ritter, Kevin Roth, Bob Schreiber, Mitch Scott, Andrey Shaw, Barry Sleckman, Ken Tung, Mark Watson, Skip Virgin and Mary Zutter joining the department.

In 1993, the Division of Molecular Oncology became part of Pathology for a short time with Stan Korsmeyer as Chief. Korsmeyer left in 1998 to be Head of the Cancer Center at Brigham and Women's Hospital and unfortunately died shortly after. This was a great loss to academic medicine as many of us thought he was the best and brightest of all. Stan was the discoverer of the Bcl-2 gene and the importance of apoptosis (TJ Ley. Stanley Joel Korsmeyer (1950-2005). Science 2005; 308 (6 May): 803-804: <https://science.sciencemag.org/content/308/5723/803/tab-pdf>), (ET Rosenthal. Apoptosis Pioneer Stanley J. Korsmeyer, MD, Dies at 54. Oncology-Times 2005; 27(9): 44-45: <https://journals.lww.com/oncology-times/pages/articleviewer.aspx?year=2005&issue=05100&article=00021&type=Fulltext>).

In 2001, the department had another name change to the Department of Pathology and Immunology and in 2006, Skip Virgin became Chair until 2017, when he left to be Chief Scientific Officer and EVP of Research at Vir Biotechnology. During Skip's tenure, the Division of Laboratory Medicine was renamed the Division of Laboratory and Genomic Medicine (LGM) and Jeff Gordon joined the LGM division (<https://source.wustl.edu/2017/03/the-father-of-the-microbiome/>). The cytogenetics laboratory was acquired from Pediatrics and integrated with LGM. Also during Virgin's time as chair, Gaya Amarasinghe, Ina Amarillo, Neil Anderson, Maxim Artyomov, Michael Barratt, Deepta Bhattacharya, Fouad Boulus, Elizabeth Brunt, Carey-Ann Dawn Burnham, Marina Cella, Dengfeng Cao, Rebecca Chernock, Gautam Dantas, Sonika Dahiya, Adish Dani, Dennis Dietzen, Eric Duncavage, Brian Edelson, Takeshi Egawa, Ali Ellebedy, John Lawrence Frater, Joseph Gaut, Susan Gilfillan, Brenda Grossman, Ian Sean Hagemann, Scott Handley, Anjum Hassan, Mai (Mike) He, Jon Heusel, Yina Huang, Ron

Jackups, Eynav Klechevsky, Hannah Krigman, Ta-Chiang Liu, Nima Mosammaparast, Gene Oltz, Bijal Parikh, Jackie Payton, Edward Pearce, Erika Pearce, Rick Perrin, Gwendalyn Jan Randolph, Karen Seibert, David Spencer, Sanjay Joshua Swamidass, Suzanne Thibodeaux, Steven Van Dyken, Monika Vig, David Wang, Mark Watson, Nabeel Yaseen , and Bernd Zinselmeyer joined the department.

Chuck Eby became Interim Chair after Skip left in 2017 until 2019 when Richard Cote became Chair and Mallinckrodt Professor. While this is still recent, Jon Brestoff, Jonathan Kipnis and Chris Farnsworth have joined the department.

In 2019 there were four divisions in Pathology and Immunology: Anatomic and Molecular Pathology, Neuropathology, Immunobiology, and Laboratory and Genomic Medicine. There were 133 full-time faculty with primary appointments in the department and ten Endowed Professorships (nine department based): The Mallinckrodt Professor of Pathology and Immunology (Chair of Department); Robert L. Kroc Professor of Pathology and Immunology; Robert Rock Belliveau, M.D., Professor of Pathology; Oree M. Carroll and Lillian B. Ladenson Professor of Clinical Chemistry; Unanue Distinguished Professor of Immunology; Andrew M. Bursky and Jane M. Bursky Distinguished Professor; Conan Professor of Laboratory and Genomic Medicine, Wilma and Roswell Messing Professor of Pathology and Immunology; Paul and Ellen Lacy Professor of Pathology and Immunology, and Ladenson Professor of Pathology are department based, and one non-department based Chair, the Dr. Robert J. Glaser Distinguished University Professor.

Table 1

History of Washington University Medical Center

- 1891 Washington University Medical Department founded when St. Louis Medical College affiliated with Washington University
- 1899 Missouri Medical College joined
- 1910 Reorganization of Medical Department
- 1914 Barnes Hospital opened near WUSM
- 1916 Children's Hospital relocated near WUSM
- 1918 Renamed the Washington University School of Medicine (WUSM)
- 1926 Jewish Hospital moved near WUSM
- 1962 Washington University Medical School and Associated Hospital created (name later changed to Washington University Medical Center)
- 1965 Vice Chancellor for Medical Affairs position created
- 1993 BJC Health System created– Barnes, Jewish and Christian Hospitals
- 1996 Barnes and Jewish Hospital fully merged

Table 2

Evolution and Organizations Involved in Medical Education Reform

- Medical Licensing by States, resurgent in 1870's.
- Medical Advances, e.g., germ theory, Pasteur, Koch, Ehrlich; vaccination by Pasteur-1885
- Johns Hopkins opens Medical School-1893, William Welch, Dean
- General Education Board – Rockefeller-1903 (Frederick T. Gates then A. Flexner, 1912-1927)
- Council on Medical Education, AMA-1904 – Arthur Dean Bevan
- Carnegie Foundation for the Advancement of Teaching-1905 (Henry Pritchett, ex-Wash U faculty, 1881 to 1887 (Flexner Report (1910) (formed TIAA in 1918)
- Federation of State Medical Boards – founded-1912

Table 3A

The Johns Hopkins Medical School (1893)

- College Degree for Admission
- Four Year Curriculum with Nine Months Terms
- Small Classes, Frequent Testing
- Laboratory and Clerkship, Primary Teaching Devices
- Research Oriented Faculty with Teaching Part of Mission
- Pre-Clinical Faculty all Full-time
- Later, Clinical Faculty Full-time; Interns, Residents
- William Welch, Chair of Pathology, Founding Dean 1893-1898
- Eugene Lindsay Opie, in first graduating class, 1893

Table 3B

General Education Board (Created in 1903)

- Created by John D. Rockefeller in 1903 to support higher education and medical schools particularly rural white and black schools in the south
- Eventually 180 million spent
- All funds left then merged into the Rockefeller Foundation
- Funded practical reform of education in the Southern states
- Higher education including medical schools
- A. Flexner secretary 1912-1927

Reference:

Wikipedia: https://en.wikipedia.org/wiki/General_Education_Board

Table 3C

Council on Medical Education (CME)

- 1904 – Founded by American Medical Association (AMA)
- Focuses on issues and initiatives related to undergraduate, graduate and continuing medical education
- Arthur Dean Bevan M.D., Founding Chair, 1904-1928
- Published evaluations and model curriculum and asked Carnegie Foundation for formal study of medical schools in 1908

References:

C. Johnson, B. Green; 100 years after the Flexner Report, J. Chirop. Educ. 2010; 24(2): 145-152; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2967338/>

AMA: The AMA, NMA, and the Flexner Report of 1910: https://faithgibson.org/wp-content/uploads/2018/09/AMA_Flexner_ltr-coverup_OloladeOlakanmi_1910.pdf

AMA Directory-3rd Edition: JAMA, 1911 (Aug. 19) pp. 660-661: <https://jamanetwork.com.beckerproxy.wustl.edu/journals/jama/fullarticle/447843>

Medical Education – A Review of Fifteen Years' Progress; JAMA, Aug 21, 1915; 65(8): 717-718 <https://jamanetwork.com/journals/jama/article-abstract/446270>

Table 3D

Carnegie Foundation for the Advancement of Teaching

- Founded in 1905 by Andrew Carnegie (President, Henry Pritchett 1906-1930)
- Funded Flexner Report for Medicine – 1908-1910, later looked at Dentistry, Engineering, Teacher Colleges
- Started Graduate Record Examinations in 1936 (to Educational Testing Service in 1948)
- Started TIAA in 1918, later made it an independent non-profit, now a for-profit financial company

References:

Wikipedia: https://en.wikipedia.org/wiki/Carnegie_Foundation_for_the_Advancement_of_Teaching

Foundation History: <https://www.carnegiefoundation.org/about-us/foundation-history/>

Table 3E

Federation of State Medical Boards

- Founded in 1912 as a merger of the National Confederation of State Medical Examining and Licensing Board, est. 1890 and The American Confederation of Reciprocating Examining and Licensing Boards, est. 1902
- Roots go back to at least 1891
- Bevan at CME and Flexner at Carnegie; both involved in Feb. 28, 1912 merger

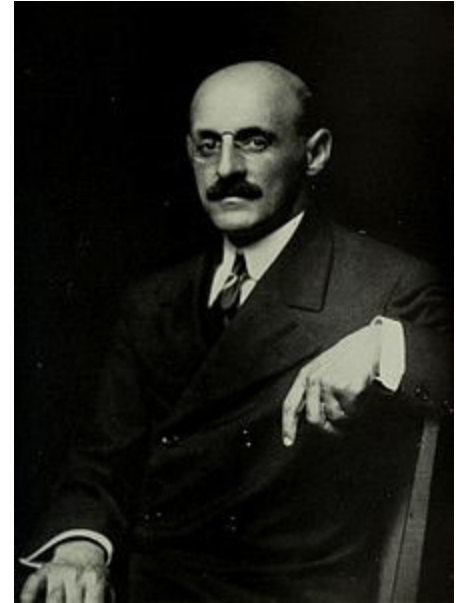
References:

D. Johnson, H.J. Chaudhry. The History of the Federation of State Medical Boards: Part One – 19th Century Origins of FSMB and Modern Medical Regulation. Journal of Medical Regulation (2012) 98(1):20-29: <https://meridian.allenpress.com/jmr/article/98/1/20/212503/The-History-of-the-Federation-of-State-Medical>

Table 4A

Abraham Flexner, PhD (1866-1959)

1886	A.B. Johns Hopkins University
1890-1905	Founded and later sold a very successful College prep school in Louisville
1906	Masters, Harvard
1907-1908	Berlin University
1908	Published book, "The American College," critical of U.S. college education
1908-1910	Commissioned by Carnegie (Henry Pritchett) to look at medical education. Personally visited 155 North American medical schools in 18 months.
1910	Published Report
1912-1927	Secretary of General Education Board, a Rockefeller funded group
1930-1939	Founding Director of Institute for Advanced Study in Princeton/ recruited Einstein in 1930



References:

Hektoen International: A Journal of Medical Humanities. Abraham Flexner: his life and legacy: <https://hekint.org/2017/01/29/abraham-flexner-his-life-and-legacy/>

The Rockefeller Foundation (/Home) A Digital History. Abraham Flexner – Biographical. https://rockfound.rockarch.org/biographical/-/asset_publisher/6ygckECN11nb/content/abraham-flexner

Table 4B

Arthur Dean Bevan, M.D. (1861-1943)

1879	Ph.B., Sheffield Scientific School of Yale
1883	M.D., Rush Medical College
1883-1902	Professor, Anatomy, Oregon State
1902-1943	Faculty, then Chair of Surgery, Rush Medical College
1904-1928	Founding Chair, AMA Council on Medical Education (CME)
1917-1918	President of the AMA



References:

American College of Surgeons: Arthur Dean Bevan, MD, FACS, 1861-1943

<https://www.facs.org/about-ac/s/archives/pasthighlights/bevanhighlight>

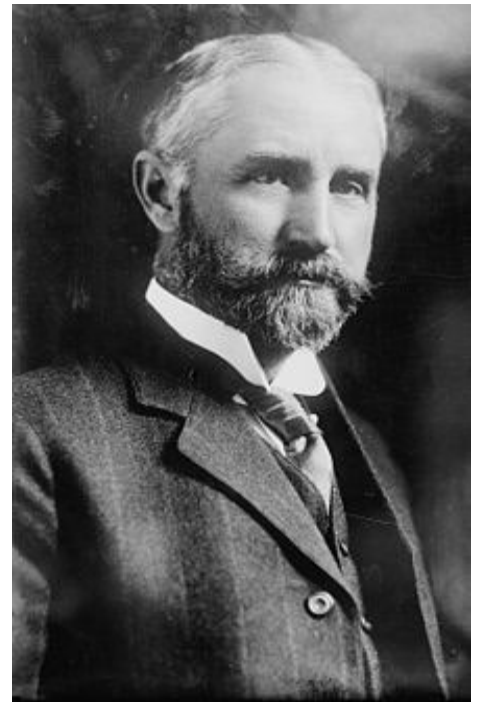
Ira M. Rutkow, MD, MPH, DRPH. Moments in Surgical History. Arch Surg. 1996; 131(8): 845:

<https://jamanetwork.com/journals/jamasurgery/article-abstract/596595>

Table 4C

Henry Smith Pritchett, PhD (1857-1939)

1875	A.B. Pritchett Institute, Glasgow, MO
1881-1887	Faculty/Astronomy and Mathematics, WashU
1887-1890	Superintendent of U.S. Coast and Geodactic Survey (now NOAA)
1894	Ph.D., University of Munich
1891-1906	President of MIT (tried but failed to merge with Harvard)
1906-1930	President of The Carnegie Foundation for the Advancement of Teaching (founded TIAA in 1918)



References:

Van Vleck Observatory: Science Through Time: The Legacy of the Van Vleck Observatory
Visitors:
<http://vvovisitors.wesleyan.edu/astronomers/person/35>

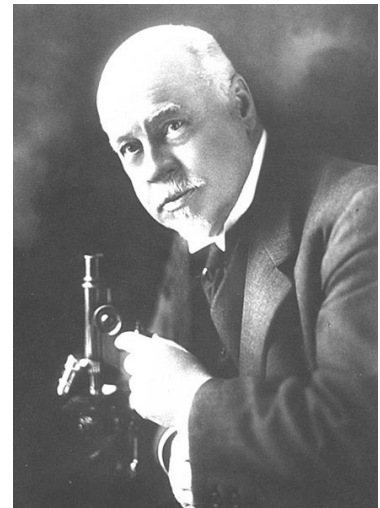
Henry Smith Pritchett, 1857-1939; MIT History:
<https://libraries.mit.edu/mithistory/institute/offices/office-of-the-mit-president/henry-smith-pritchett-1857-1939/>

Dateline Boston 1905, Henry Smith Pritchett: <http://boston1905.blogspot.com/2011/10/henry-smith-pritchett.html>

Table 4D

William Henry Welch, M.D. (1850-1934)

1870	A.B., Yale
1875	M.D., Columbia
1875-1876	Intern at Bellevue Hospital
1876-1878	Strasbourg, Leipzig, Breslau, Vienna, Berlin
1878-1884	Pathological Anatomy and Pathology, Bellevue Hospital Medical College, Founded First Pathological Laboratory
1884-1916	First Baxley Professor and Chair of Pathology, Johns Hopkins
1893-1898	First Dean, Johns Hopkins
1913-1916	President, National Academy of Sciences
1916-1926	First Director, Hopkins School of Public Health
1901-1937	First President of Scientific Directors, Rockefeller (advised on Peking Union Medical College)
1913-1932	Many other firsts and boards including: AAAS, History of Science, Maryland State Board of Health, Carnegie Institution of Washington, Peking Union Medical College, General Education Board



References:

Chronology of the Life of William Henry Welch:

<https://medicalarchives.jhmi.edu:8443/welch/chronology.htm>

Table 4E

Simon Flexner (brother of Abraham) (1863-1946)

1889	M.D., Louisville Medical School
1890-1899	Fellow and Faculty in Pathology: Johns Hopkins University with William Henry Welch
1899-1902	Chair of Pathology, University of Pennsylvania
1903-1935	Rockefeller Institute for Medical Research: First Director
1908	Elected National Academy of Sciences



References:

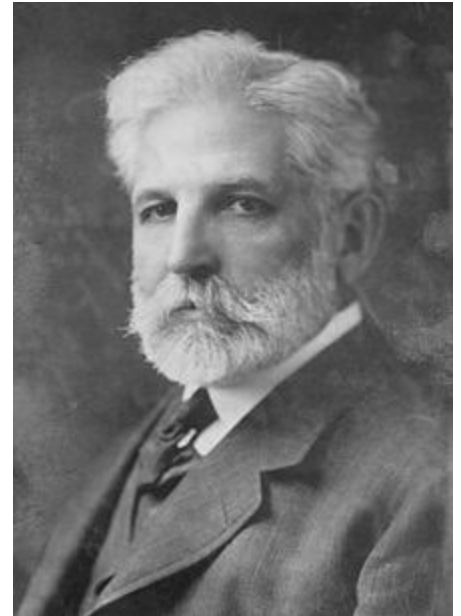
Whonamedit.com: <https://www.whonamedit.com/doctor.cfm/3004.html>

J.E. McCartney, Dr. Simon Fletcher, Nature 1946; 157: 867-8.
<https://www.nature.com/articles/157867b0>

Table 5

Robert Somers Brookings (1850-1932)

1867	Went to work at Cupples and Marston (household goods)
1872	He and his brother became partners with Cupples <ul style="list-style-type: none">• Millionaire by 1880
1891-1928	Board of WashU; Chair 1895-1928 <ul style="list-style-type: none">• Planned and helped finance move to the now Danforth Campus• Rented out many of the buildings for the World's Fair of 1904 before University use to help pay for relocation
1908	Started to look at medical school
1928	Founded Brookings Institution in Washington



Notes:

With the possible exception of the founders of Washington University, <https://magazine-archives.wustl.edu/Summer03/FoundingOfWashU.html> Brookings was the essential person in the history of Washington University and its medical school. He moved the University to its current location, revamped the physical plant, and then did the same for the medical school.

References:

Olin Business School Centennial: Robert S. Brookings: Entrepreneur, philanthropist, civil servant: <https://olin100.wustl.edu/2017/01/24/robert-s-brookings-entrepreneur-philanthropist-civil-servant/>

Wikipedia: Robert S. Brookings: https://en.wikipedia.org/wiki/Robert_S._Brookings

Table 6

New Department Chairs at WUSM from 1911 WUSM Bulletin

- Robert J. Terry, M.D. (1871-1966) – Anatomy (1910-1941) only hold over
- Joseph Erlanger, MD (1874-1965) – Physiology (1910-1946)
- Eugene Lindsay Opie, MD (1873-1971) – Pathology and Bacteriology (1910-1923)
- Philip A. Shaffer, PhD (1881-1960) – Biological Chemistry (1910-1951)
- George Dock, MD (1860-1951) – Medicine (1910-1922)
- Fred T. Murphy, MD (1872-1948) – Surgery (1910-1919)
- John Howland, MD, Pediatrics – after six months went to University of Pennsylvania. In 1917, William McKim Marriott, MD became Chair and later Dean, WUSM
- David Linn Edsall, MD – Preventive Medicine, taught Public Health for one year, then went to Harvard

Table 7**Chairs of Pathology and Immunology – WUSM**

<u>Years</u>	<u>Name (all MD or MD, PhD)</u>	<u>Notes</u>
1910-1923	Eugene Lindsay Opie	Pathology & Bacteriology, Dean 1912-1923
1924-1937	Leo Loeb	Pathology (came to St. Louis in 1910)
1938	Howard Anderson McCordock	3-7 Faculty before WWII
1938-1939	Margaret Gladys Smith	Acting, de facto
1939-1954	Robert Allan Moore	Dean 1946-1954
1950-1951	Gustave J. Dammin	Interim and Designated Chair
1954-1961	Walter Stanley Hartroft	~30 Faculty
1961-1984	Paul Eston Lacy	“Official” Divisions
1985-2006	Emil Raphael Unanue	Pathology and Immunology
2006-2017	Herbert (Skip) W. Virgin IV	Renamed Lab Med to Laboratory and Genomic Medicine Division
2018-2019	Charles (Chuck) Eby	Interim
2019-present	Richard J. Cote	~110 Faculty

Table 7A

PATHOLOGY CHAIRS

EUGENE LINDSAY OPIE, MD (1873-1971)

1893	A.B., Johns Hopkins
1897	M.D. Johns Hopkins (first graduating class)
1897-1904	Pathology and pancreatic research with William H. Welch*
1904-1909	Rockefeller Institute for Medical Research (now Rockefeller University) (hired by Simon Flexner) Visiting pathologist at Columbia Presbyterian Hospital
1910-1923	MALLINCKRODT PROFESSOR AND CHAIR OF PATHOLOGY AND BACTERIOLOGY, WUSM
1912-1923	Dean of WUSM; WWI in Medical Corps
1923	Elected to National Academy of Science
1923-1932	Director, Phipps Institute for the Study and Treatment of Tuberculosis at the University of Pennsylvania, and Chair of Pathology
1932-1941	Chair of Pathology, Cornell University Medical Center
1941-1969	Guest Investigator – Rockefeller Institute



*Other students of Welch included Walter Reed, Simon Flexner (brother of Abraham Flexner), George Whipple and Peyton Rous.

Notes:

Harvey Cushing helped recruit Opie. Opie's father, Thomas was a surgeon and one of the founders and long the Dean of the College of Physicians and Surgeons of Baltimore (later the Medical College of the University of Maryland). Opie studied pancreatic disease in his early career, helping to establish morphological changes in the Islets of Langerhans with diabetes as a medical student and that gallstones obstructing the ampulla of Vater are a possible cause for acute pancreatitis. He shifted to the study of tuberculosis and immunity after World War I including studies in China and Jamaica. His last paper was published in 1970 when he was 97 years old. He was president of the American Association of Immunologists 1928-1929. President of the American Association of Pathologists and Bacteriologists in 1918 and American Society for Investigative Pathology (ASIP) in 1923.

References:

Kidd JG, Eugene Lindsay Opie, M.D., 1873-1971. American Journal of Pathology 1971: 65(3): 483-492. <https://www.ncbi.nlm.nih.gov/pmc/issues/152927/>

Table 7A (Cont)

Long ER, Eugene Lindsay Opie 1873-1971, National Academy of Sciences 1975 (has a complete list of his publications) <https://www.nap.edu/read/570/chapter/10>

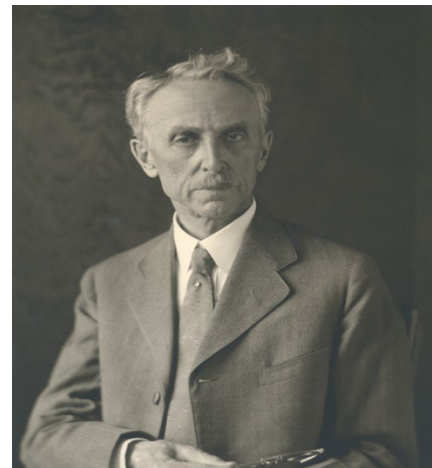
Opie, E.L, The Peripatetic Education of a Pathologist. Medical Clinics of North America. 1957; 935-52. W.B. Saunders
<https://www.sciencedirect.com/science/article/abs/pii/S0025712516343978>

Eugene L. Opie, MD Brief Bio. The American Association of Immunologists:
<https://www.aai.org/About/History/Past-Presidents-and-Officers/EugeneLOpie>

Table 7B

LEO LOEB, MD (1869-1959)

1897	M.D. (with thesis) University of Zurich
1897-1902	Private Medical Practice and Adjunct Professor of Pathology at The Medical School of the University of Illinois; set up his own research laboratory studying wound healing while in private practice in a room behind a drug store. Periodic visiting scholar in pathology, Johns Hopkins University School of Medicine
1902-1903	Research Fellow, McGill University (too cold for him due to TB as child)
1904-1910	Assistant Professor of Experimental Pathology; University of Pennsylvania
1910-1915	Director of Research, Barnard Skin and Cancer Hospital
1915-1924	Professor of Comparative Pathology, WUSM
1924-1937	MALLICKRODT PROFESSOR AND CHAIR, DEPARTMENT OF PATHOLOGY, WUSM
1937	Elected to the National Academy of Science
1937-1941	Emeritus Professor of Pathology, WUSM



Notes:

Author of over 400 papers, articles or book chapters, sometimes called the Founder of Experimental Cancer Research. He described his research as “studies of growth processes of tissues and tumors and cell multiplication and movement.” He was an authority on tissue transplantation and tumor growth, notably hormonal influences. His complete bibliography can be found in his obituary by Ernest W. Goodpasture. Loeb had wide interests as can be seen from the books he authored: *Venom of Heloderma* 1913; *The Biological Basis of Individuals* 1945, and two additional books he was working on before he died. One concerned the causes and nature of cancer and the other, psychical features of human life.

A former student, Carl V. Moore, MD, Chair of Internal Medicine at WUSM from 1955-1972, recalled that, “Loeb spoke on the meaning of life and death in a manner of a scientific philosopher as well as one of the world’s leading biological scientists” (Anderson reference below). Hartcroft noted words from Loeb’s autobiographical notes, “We should give simple psychical goods-kindness, understanding, appreciation and affection-as much as possible to others, and we should not restrict the application of simple psychical goods to certain limited groups, such as family and nation, although we should not diminish greatly our gifts to those nearest to us but rather should grant them to wider circles.” Also described as a gentle soul with an aversion to competition (his favorite recreation was horseback riding).

Table 7B (Cont)

Loeb was orphaned at the age of 6 and spent much of his childhood in his uncle's home. He had tuberculosis as a child which gave him periodic problems throughout his life. He was close with his cousin who was to marry Albert Schweitzer and work with him in Africa. Loeb married Georgiana Sands, M.D. in 1922. He was President of the American Association of Pathologists and Bacteriologists in 1915.

References:

Ernest W. Goodpasture, Leo Loeb 1869-1959, National Academy of Science 1961 (contains his complete bibliography). <http://www.nasonline.org/member-directory/deceased-members/20001629.html>

Herman J. Blumental, Leo Loeb, Experimental Pathologists and Humanitarian. Science 1960; 131: 907-8. <https://science.sciencemag.org/content/131/3404/907>

Leo Loeb. Autobiographical Notes. Perspectives in Biology and Medicine 1958: 11(1) 1-23. <https://muse.jhu.edu/article/405598>

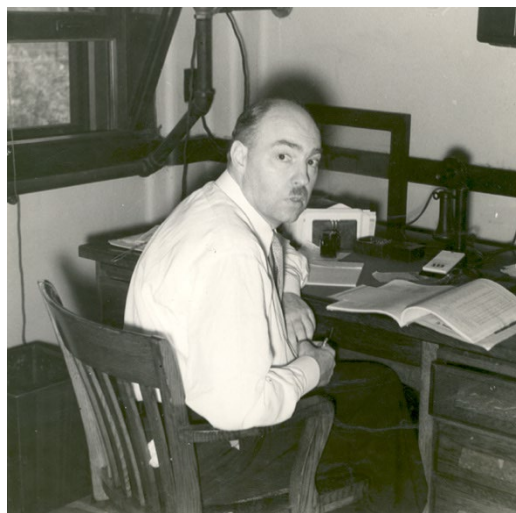
W. Stanley Hartroft, Leo Loeb (1869-1959) Arch Path 1960; 760:264-74

Paul G. Anderson. Loeb Biography, Medical Journeys Becker Library. <http://beckerexhibits.wustl.edu/mig/bios/loeb.html>

Table 7C

HOWARD ANDERSON MCCORDOCK, M.D. (1895-1938)

1921	B.S. University of Buffalo
1923	M.D. University of Buffalo
1923-1929	Pathology, Johns Hopkins University
1929-1938	Pathology faculty, WUSM
1938	MALLINCKRODT PROFESSOR AND CHAIR, DEPARTMENT OF PATHOLOGY, WUSM



Notes:

McCordock's complete list of publications follows his obituary by Leo Loeb. He extensively studied the pathology of viruses especially the encephalitis epidemic in St. Louis in the 1930's (mistakenly called sleeping sickness by some reporters which was of concern as some missionaries were returning from Africa and there was concern for the public reaction to them), and was part of the team which developed animal models in mice and monkeys. He stressed the application of pathology for clinical purpose and was a master at clinical pathological conferences. While at Johns Hopkins he proposed with Arnold Rich that mycobacterium tuberculosis can invade the CNS forming "tuberculomas" (Rich Focus) which are able to rupture, causing meningitis the most severe form of TB. Wikipedia: https://en.wikipedia.org/wiki/Rich_focus. He died suddenly on November 13, 1938 of rheumatic heart disease shortly after being named Chair. He was a member of The Royal Society of Photographers in England. McCordock became Chair on July 1, 1938 and died on November 13, 1938.

The Howard A. McCordock book prize in Pathology is awarded after the second year to a member of that class for general excellence in Pathology.

References:

Leo Loeb: In Memoriam, Howard Anderson McCordock. Washington University Alumni Quarterly Jan. 1939; pp 60-63. https://digitalcommons.wustl.edu/med_alumni_quarterly/6/

Howard Anderson McCordock: The St. Louis Epidemics of Acute Encephalitis, *ibid.* April 1938; pp. 141-147. https://digitalcommons.wustl.edu/med_alumni_quarterly/3/

Table 7D

MARGARET GLADYS SMITH (1896-1970)

1918	A.B. in Chemistry, Mt. Holyoke College
1922	M.D., Johns Hopkins University
1922-1929	Pathology, Johns Hopkins University
1929-1964	Faculty, WUSM
1938-1939	ACTING CHAIR (defacto) OF PATHOLOGY, WUSM
1964-1970	Professor Emeritus of Pathology, WUSM



Notes:

Considered one of the founders of Pediatric Pathology; isolated the St. Louis encephalitis virus; worked extensively on cytomegalovirus (CMV), isolating it in 1954; first to prove that herpes/simplex, a virus, could be a cause of acute encephalitis; and one of the first to identify toxoplasma gondii as a pathogen (Am J Pathology 1941; 17: 55-68).

Author (with John M. Kissane) of “Pathology of Infancy and Childhood” in 1967.

Upon the sudden death of Howard A. McCordock on November 13, 1938 she became defacto Acting Chair of Pathology from Fall 1938 to July 1939, and thus the first woman to head a department at Washington University School of Medicine. Edwin Lennette, a pioneer of diagnostic virology and president of AAI 1966-1967, shared a laboratory with Smith at WUSM and commented, “I think if she had been born later, she certainly would have been the Chairman of the department. She was that kind of person.” (See his oral history reference below.) She overlapped at Mt. Holyoke College with Mildred Trotter, PhD (1899-1991); long-time teacher of anatomy at WUSM who graduated there in 1920 in Zoology (Mildred Trotter 1899-1991) Medical Journeys, Becker Library, WUSM: <http://beckerexhibits.wustl.edu/mig/bios/trotter.html> .

The Doctor Margaret G. Smith Award is given to a woman medical student for outstanding achievement in the second year of medical school.

References:

Reddehase, MJ. Margaret Gladys Smith, mother of cytomegalovirus: 60th anniversary of cytomegalovirus isolation. Med. Microbiol Immunol 2015; 204: 239-241. <https://www.deepdyve.com/lp/springer-journals/margaret-gladys-smith-mother-of-cytomegalovirus-60th-anniversary-of-P5APTz9KNM>

Dehner, LP. Founders of Pediatric Pathology: Margaret G. Smith and John M. Kissane. Pediatric and Developmental Pathology. 2016; 19; 310-314. <https://journals.sagepub.com/doi/10.2350/16-04-1800-PB.1>

Oral History Transcript, Edwin H. Lennette. 1988, Bancroft Library University of California Berkeley. Early Years WUSM, pp 33-37. https://ohcsearch.lib.berkeley.edu/catalog/MASTER_618

Table 7D (Cont)

Becker Library: Margaret G. Smith, Medical Pioneer: <https://becker.wustl.edu/news/margaret-g-smith-medical-pioneer/>

Margaret G. Smith; Women in Health Sciences:
<http://beckerexhibits.wustl.edu/mowihsp/bios/smith.htm>

John M. Kissane Memorial to Margaret Gladys Smith, Margaret Gladys Smith Papers.
<http://beckerexhibits.wustl.edu/mowihsp/bios/KissaneMemSmith.htm>

Margaret G. Smith, History of the Department of Pathology, WUSM, 1965. Obtained courtesy of Stephen Logsdon, Archivist, Becker Library, WUSM.

Table 7E

ROBERT ALLAN MOORE (1901-1971)

1921	A.B., Ohio State University
1927	M.S., Ohio State University
1928	M.D., Ohio State University
1928-1938	Pathology Faculty, Cornell University Medical Center
1939-1951, 1952-1954	MALLINCKRODT PROFESSOR AND CHAIR OF PATHOLOGY, WUSM
1946-1954	Dean, WUSM
1954-1957	Vice Chancellor of the Schools of Health, University of Pittsburgh
1957-1960	President of Downstate Medical Center and Dean of the College of Medicine of the State University of New York



Notes:

He was a specialist in genitourinary pathology. He was president of the National Board of Medical Examiners, 1954-57, among other organizations and an advisor to Ministries of Health in many countries. He received honorary degrees from Ohio State, University of Miami and Long Island University. A Robert A. Moore Lectureship was created at the Downstate Medical Center. He was involved in building up the practical service activities of the department. Used to say, "I am a simple doc." (Ruth Silberberg, M.D. Oral History – 1976). Wrote a textbook on pathology (1952). Opie advised him on going to Washington University when they were both at Cornell for seven years. He was called a very effective recruiter by Bernard Becker, who he recruited to be Chair of Ophthalmology (Oral History transcript Bernard Becker). He was described as formal (jacket and tie even in summer), dignified, and excellent at clinical pathology conferences (CPC) even when he was not familiar with the case. He brought prestige to the department (Maggie Smith, History of Department of Pathology, 1965). He was President of the American Association of Pathologists and Bacteriologists in 1952.

References:

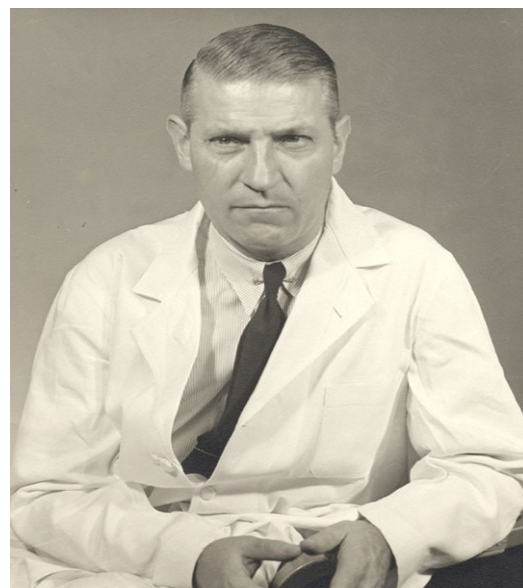
Becker Library, The Modern Era, 1930-1991: <http://beckerehibits.wustl.edu/wusm-hist/modern/index.htm>

N.Y Times Obituary, September 25, 1971: <https://www.nytimes.com/1971/09/25/archives/-led-downstate-medicalcenter-pathologist-i-was-a-former-dean-of.html>

Table 7F

GUSTAVE J. DAMMIN, M.D. (1911-1991)

1934	B.S., Cornell
1938	M.D., Cornell Medical College
1938-1939	Intern in Medicine, Johns Hopkins
1939-1940	Resident in Medicine, Peter Bent Brigham
1940-1941	Pathology resident, Columbia University
1941-1946	Military
1946-1952	Faculty, Pathology and Medicine, WUSM
Dec 1950- Dec 1951	CHAIR OF PATHOLOGY, WUSM
1952-1974	Professor, Harvard and Chair of Pathology, Peter Bent Brigham
1985	WashU-Harvard Trade completed when Emil Unanue comes to WUSM



Notes:

Was first pathologist identified as doing clinical pathology in the Medical School Bulletin in 1946. It was announced that he was Chair of Pathology effective December 1, 1950 and would become Professor and Chair on July 1, 1951 (Barnes Hospital Record, December 1950). He resigned December 19, 1951 and went to Peter Bent Brigham (Harvard) as Chair of Pathology. He was part of a team in 1954 that performed the first renal transplant and became an authority on organ transplant pathology. Extensively studied infectious disease, particularly parasitic tropical disease during time in the military. He also later studied Lyme disease and borreliosis. When the vector of *Borrelia burgdorferi*, the agent of Lyme disease was discovered, this deer tick was initially named *Ixodes dammini* in his honor, until it was determined that this northern form was the same species as *Ixodes scapularis*. Said to be relieved that the name was changed.

References:

Barnes Hospital Record, December 1950: https://digitalcommons.wustl.edu/bjc_barnes_record-1950s/index.5.html

Barnes Hospital Record, November, 1952: https://digitalcommons.wustl.edu/bjc_barnes_record-1950s/index.5.html

Washington University Medical Alumni Quarterly July 1946, p. 185: https://digitalcommons.wustl.edu/med_alumni_quarterly/34/

Obituary, N.Y. Times, October 13, 1991: <https://www.nytimes.com/1991/10/13/nyregion/gustave-dammin-pathologist-80-authority-on-organ-transplants.html>

Table 7G

WALTER STANLEY HARTROFT, M.D., PH.D. (1916-1981)

1941	B.Sc. in Medicine, University of Alberta, M.D. University of Toronto
1941	M.D., University of Toronto
WWII	Canadian Military
1946-1954	Banting and Best Department of Medical Research, University of Toronto
1949	Ph.D., University of Toronto
1954-1961	MALLINCKRODT PROFESSOR AND CHAIR OF PATHOLOGY, WUSM
1961-1970	Head, Research Institute of Hospital for Sick Children, Toronto
1971-1981	John A. Burns School of Medicine, University of Hawaii



Notes:

Built up the research infrastructure of the department and renovated space

In 1961 had a disagreement with the administration over the need to develop a residency program in clinical pathology at Barnes Hospital and went back to Toronto (see reference).

References:

Robert O'Neal, Memoir of W. Stanley Hartroft; *Experimental and Molecular Pathology* 1982; 36: 132-134. Also summarized in Hartroft, W. Stanley, Vertical File, Becker Library:

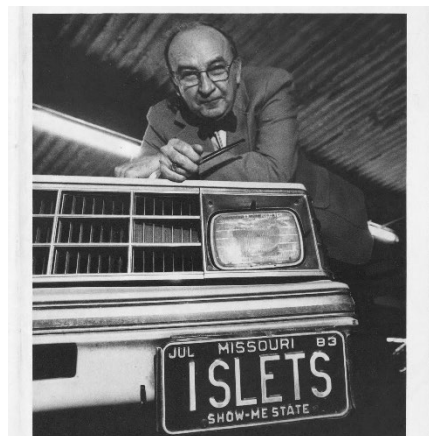
<https://beckerarchives.wustl.edu/VF03092>

<https://pubmed.ncbi.nlm.nih.gov/7035217/>

Table 7H

PAUL ESTON LACY, M.D., PH.D. (1924-2005)

1944	B.S., Ohio State University
1948	M.D, Ohio State University
1949	Intern, White Cross Hospital, Columbus, OH
1950-52	Military Service
1955	Ph.D., Mayo Foundation and University of Minnesota
1955-1961	Anatomy Department, WUSM
1961-1984	MALLINCKRODT PROFESSOR AND CHAIR OF PATHOLOGY, WUSM
1983	Elected to the National Academy of Science
1984-1994	Robert L. Kroc Professor in Pathology
1994-2005	Professor Emeritus



Notes:

Studied diabetes and performed pioneering experiments in animal and human islet cell isolation and transplantation leading to the first islet cell transplantation in 1989 with Dave Sharp that led to the patient being insulin-free. A later successfully transplanted patient asked him to be best man at his wedding. Developed the division concept in the department, first with Anatomic Pathology in 1965 and then Laboratory Medicine in 1969. Along with Dave Kipnis, Chair of Medicine, they fulfilled a vision of research throughout the school with strong ties between basic and applied science.

He was known as Sam growing up but not as an adult. Wanted to join NASA as an astronaut but was too tall but did become a member of their NASA Scientific Advisory Board. He also applied years later, when Chair of Pathology, to be a scientist/astronaut but was not selected. He helped Lee Ducat start the Juvenile Diabetes Foundation in 1970. He originally came to Washington University in the Anatomy department from Mayo a year after Sarah Amanda Luse to learn electron microscopy. He was President of ASIP in 1983.

Paul Lacy was my first Chair of Pathology and an exceptional individual. He had been an Associate Dean for a few years, without any responsibilities except to learn how the medical school operated. The Dean then was Ed Dempsey, also Paul's Chair in Anatomy at the time. Dempsey wanted him to learn how the school operated. This was during the time of the rift between Dempsey and Edgar Queeny, Chair of Barnes Hospital (described in LGM section). Soon after, Paul was appointed Chair of Pathology, he viewed administration as similar to research; you try things until they work and they did.

Table 7H (Cont.)

References:

Jeffrey E. Saffitz, Robert E. Schmidt and Michael McDaniel. Dr. Paul Lacy, 1924-2005. Am J Pathol 2005 Aug; 167(2): 299-300.

<https://www.sciencedirect.com/science/article/pii/S0002944010629744>

Stephen Pincock. Paul E. Lacy. Lancet 2005; 365: pg. 1024.

[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(05\)71126-0/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(05)71126-0/fulltext)

R. Paul Robertson. Tribute: Paul Eston Lacy, MD, PhD; Diabetes, 2005; 54: 2497-8.

<https://diabetes.diabetesjournals.org/content/54/8/2497>

Dr. Paul Eston Lacy 1924-2005 Obituary. Vensil & Chute Funeral Home

<https://www.vocfh.com/obituary/1103122>

Paul E. Lacy Oral History Transcript 1979. Not on-line; obtained courtesy of Steven Logsdon, Archivist, Becker Library.

Table 71

EMIL RAPHAEL UNANUE (1934-2022)



1960	M.D., University of Havana School of Medicine (Cuba)
1961-1962	Intern in Pathology, Presbyterian University Hospital, Pittsburgh, PA
1962-1966	Fellow, Experimental Pathology, Scripps Clinical and Research Foundation (with Frank J. Dixon)
1966-1968	Fellow, Immunology Division, NIMR, London (with Brigitte Askonas)
1968-1970	Associate, Experimental Pathology, Scripps Clinical and Research Foundation
1970-1984	Department of Pathology, Harvard Medical School
1974-1984	Mallinckrodt Professor of Immunopathology, Harvard Medical School
1985-2006	MALLINCKRODT PROFESSOR AND CHAIR OF PATHOLOGY WUSM
1987	Elected to the National Academy of Sciences
1995	Albert Lasker Award for Basic Research
2005	Robert Koch Gold Medal
2006-	Paul and Ellen Lacy Professor of Pathology and Immunology, WUSM

Notes:

He received the Albert Lasher Award for Basic Research in 1995 and The Robert Koch Gold Medal in 2005 amongst his many awards and named lectures. During his time as Chair, the Division of Immunobiology was created and the department renamed Pathology and Immunology in 2001. He was President of ASIP in 1988, received Lifetime Achievement Award in 2014 and became a Distinguished Fellow in 2019.

References:

Department C.V.

Medical Journeys Becker Exhibits: <http://beckerexhibits.wustl.edu/mig/bios/unanue.html>

Wikipedia: https://en.wikipedia.org/wiki/Emil_R._Unanue

Emil R. Unanue, Starting in Immunology by Way of Immunopathology. Annual Review of Pathology: Mechanisms of Disease. 2011; 6: 1-18:
<https://www.annualreviews.org/doi/abs/10.1146/annurev-pathol-011110-130300>

Lasker Foundation, Emil Unanue: Explaining the Key Role of Macrophages in Fighting Pathogens:
<https://laskerfoundation.org/emil-unanue-explaining-the-key-role-of-macrophages-in-fighting-pathogens/>

Table 7J

HERBERT (SKIP) W. VIRGIN, IV, M.D., PH.D. (1956-)

1977	B.S., Harvard University
1985	M.D., Ph.D., Harvard Medical School (with Emil Unanue)
1985-1990	Resident in Medicine and Postdoctoral Fellow, Brigham and Women's Hospital, Harvard Medical School
1990-present	Pathology Faculty, WUSM
2006-2017	MALLINCKRODT PROFESSOR AND CHAIR, PATHOLOGY AND IMMUNOLOGY, WUSM
2016	Elected to the National Academy of Science
2018-present	Executive Vice President of Research and Chief Scientific Officer VIR Biotechnology
2018	Adjunct Professor, WUSM



Notes:

During his tenure, the Division of Laboratory Medicine was renamed the Division of Laboratory and Genomic Medicine. He is a leader in the field of virology and autophagy and established murine norovirus as a model system for studying norovirus biology including the roles of autophagy and interferon stimulator genes during viral infection.

References:

Department CV

Wikipedia: https://en.wikipedia.org/wiki/Herbert_W._Virgin

Murphy, Virgin elected to National Academy of Sciences:

<https://source.wustl.edu/2016/05/murphy-virgin-elected-national-academy-sciences/>

Table 7K

CHARLES (CHUCK) EBY (1955-)

1977	B.S., Duke University
1981	M.D., Vanderbilt University
1981-1987	Medicine resident and Fellow, Oncology and Hematology, University of Rochester, Strong Memorial Hospital
1987-1989	Pittsfield, MA, Private Practice, Hematology-Oncology, Berkshire Physicians and Surgeon
1989-1993	Fellow, Faculty, WUSM
1993-2000	Faculty, St. Louis University
2000-present	Faculty, WUSM
2015-present	Co-Chief or Chief, Division of Laboratory and Genomic Medicine, WUSM
2018-2019	INTERIM CHAIR OF PATHOLOGY AND IMMUNOLOGY, WUSM



Notes:

A past President (2011-2014) of the International Society for Laboratory Hematology and active in a number of professional organizations. On the Editorial Board of Clinical Chemistry and International Journal of Laboratory Hematology. One of the outstanding citizens of the Department.

References:

Charles S. Eby, MD – Biosketch: https://oncology.wustl.edu/people/faculty/Eby/Eby_Bio.html

Department C.V.

Table 7L

RICHARD J. COTE, M.D. (1954-)

1976	B.S, B.A., University of California, Irvine
1980	M.D., University of Chicago
1980-1981	Surgery Intern, University of Michigan
1981-1983	Postdoctoral Fellow, Memorial Sloan Kettering (Lloyd J. Old)
1983-1985	Memorial Sloan Kettering, Research Associate, Laboratory of Tumor Immunology
1985-1990	Pathology Resident, Cornell University Medical College
1987-1990	Surgical Pathology Fellowship, Memorial Sloan Kettering
1990-2009	Pathology Faculty, University of Southern California
2009-2019	Chair, Department of Pathology, University of Miami
2019-present	MALLINCKRODT PROFESSOR AND CHAIR, PATHOLOGY AND IMMUNOLOGY WUSM
2021	Elected Senior Member, National Academy of Inventors



Notes:

Studies the elucidation of cellular and molecular pathways of tumor progression and nanoscale technology for cancer diagnosis. He is a member and advisor to a number of national and international study groups.

References:

Department C.V.

Richard Cote's Biography, CellTech 2014:

<http://selectbiosciences.com/conferences/biographies.aspx?speaker=343572&conf=ca2014>

Evolution of Divisions of Pathology

There were six departments at WUSM listed in the 1912 Bulletin: Anatomy, Biological Chemistry, Medicine, Pathology, Pediatrics, and Surgery. As clinical needs increased over time there started to be offshoots of some departments. Sometimes these were clearly delineated in the annual WUSM bulletins and sometimes they were noted as a department research interest or an area of teaching. In the 2019-2020 Bulletin, the Pathology and Immunology department lists four divisions: Anatomic and Molecular Pathology (Surgical Pathology), Neuropathology, Immunobiology, and Laboratory and Genomic Medicine (Clinical Pathology). All of these divisions started in other departments. When created in 1910, the Pathology and Bacteriology department was involved only in research, teaching, and the autopsy service. The evolution of the department divisions is described individually below.

Anatomic and Molecular Pathology (Surgical Pathology)

An excellent review of Surgical Pathology (also called Anatomic Pathology, AP) at Barnes Hospital before 1948 has been written by Dehner and Kissane, two notable members of the department (Louis P. Dehner and John M. Kissane, *Surgical Pathology at the Washington University Medical Center and Barnes Hospital*. Chapter 7 in *The History of American Surgical Pathology*, ed. Juan Rosai 1997 AFIP). A history of some earlier days of surgical pathology within the department of pathology can also be found in the 1965 department history by Margaret Smith (not on-line, obtained courtesy of Stephen Logsdon, Archivist, Becker Library). There is also an autobiography by Lauren Ackerman in the 1997 Rosai book but I did not have access to it.

Surgical pathology started as part of the Surgery department, as did Anesthesiology, Radiology, and various surgical sub-specialties such as Neurosurgery. This was quite common with only a few exceptions (L. Maximilian Buja (2021) *The Texas Society of Pathologists: molded by the legacy of pathology and focused on excellence in medicine for 100 years and beyond*,

Baylor University Medical Center Proceedings, 34:1, 199-214:

<https://www.tandfonline.com/doi/full/10.1080/08998280.2020.1812366>). Surgical Pathology stayed within the purview of trained surgeons at WUSM until the first purely trained surgical pathologist, Lauren Ackerman, came to the Surgery Department in 1948.

Barney Brooks, Isaac Yale Olch, Nathan Anthony Womack and Charles Eckert were surgeons who had been responsible for surgical pathology before Ackerman. They were all quite successful surgeons and it appears that the surgical pathology service was quite good. Isaac Yale Olch is thought to be the first person to introduce a surgical pathology conference (Dr.

Nathan A. Womack discusses R. Evarts A. Graham:

<https://oculus.nlm.nih.gov/cgi/t/text/pageviewer-idx?c=oralhist;cc=oralhist;idno=2935145r;seq=1>, p. 15-16). Three of these individuals left to be Chairs of academic surgery departments; Brooks, the first Chair at Vanderbilt; Womack to Iowa and then to University of North Carolina; and Eckert to Albany Medical College.

In 1948, Lauren Ackerman (Table 8A) moved from the Ellis Fischel Cancer Hospital in Columbia, MO to the surgery department at WUSM. He had an appointment in the Pathology department earlier starting in 1942, and moved solely to the Pathology department in 1965. It appears that the original appointment in pathology was related to collaborations, e.g., Morris Moore (Table 12I) and eventual rotations by pathology residents to his hospital in Columbia, MO.

The Chiefs of the Surgical Pathology Division within the department of Pathology and Immunology, starting with Ackerman, are noted in Table 8. Ackerman was known for his training program and his two books. He was surprised at the notoriety from writing books as compared with papers. Ackerman received the Gold-Headed Cane Award from ASIP for Lifetime Achievement in 1986 amongst other awards.

After Ackerman retired in 1973, Walter C. Bauer was head of surgical pathology from 1973 to 1987. Besides his skills in surgical pathology, Bauer was known for his role in the St. Louis

Baby Tooth Survey in the 1950's and 1960's which studied almost 300,000 baby teeth for strontium-90, a nuclear fission product. The study concluded that strontium-90 from atmospheric atomic bomb testing settled on grass, was eaten by cows, and then absorbed by children when drinking cow's milk. The study was a factor leading to the 1963 nuclear test ban treaty. Bauer was also a marathon runner and mountain climber.

Bauer was followed by Bob McDivitt and then Pepper Dehner. During Dehner's time as Chief, the division name was changed to Anatomic Pathology (AP). Dehner was followed by Peter Humphrey and the name changed again in 2008 to Anatomic and Molecular Pathology. Humphrey was followed by Steve Teitelbaum, then John Pfeifer and now Joe Gaut.

There have been members of the department who can be considered surgical pathologists who have gone on to chair departments elsewhere. These include:

- **Joseph Wheeler Grisham**, Faculty 1957-1973, then Chair, University of North Carolina from 1973-1999. Past-President of FASEB and ASIP (1984) and ASIP Gold-Headed Cane recipient in 2002.
<https://www.asip.org/membership-community/awards-honors/meritorious-awards/asip-gold-headed-cane-award/>
<https://uncrfa.web.unc.edu/why-we-chose-dr-grisham/>
- **Robert Hodgson Heptinstall** (1921-2021) Visiting Professor 1960-1962. Chair, Johns Hopkins 1969-1988. Johns Hopkins Department of Pathology. News In Memoriam January, 2021 <https://portraitcollection.jhmi.edu/portraits/heptinstall-robert-hodgson>
- **Jay L. Hess**, (Faculty 1993-1999) Chair, University of Michigan, 2005-2013; then Dean and Executive VP-Clinical Affairs, Indiana School of Medicine, 2013-present:
<https://medicine.iu.edu/faculty/6512/hess-jay>
- **Michael W. Lieberman**, (Faculty 1976 – 1984) Chair of Pathology, Fox Chase Cancer Center, then in 1988 Chair at Baylor College of Medicine and Founding Director of Baylor Cancer Center. Past-President of ASIP (1993) and a Gold-Headed Cane Winner in 2006. Also a published author and poet.
<https://scholars.houstonmethodist.org/en/persons/michael-w-lieberman>
<https://anopenbookblog.org/physician-turned-writer-michael-lieberman-talks-about-his-work/>

- **Robert M. O’Neil** (xxxx-xxxx) Faculty 1954-1960, then Chair, Baylor (1961 to 1969), then Oklahoma (1970-1977), then Mississippi (1978-1987). History of Pathology in Texas, Chapter 8, pp. 171-172: <https://digitalcommons.library.tmc.edu/ebooks/11/>. History of the Pathology Department, University of Mississippi: <https://www.umc.edu/som/Departments%20and%20Offices/SOM%20Departments/Pathology/About-the-Department/Overview.html>
- **Juan Rosai**, (1940-2020) Faculty 1971-1974, later Chair of Pathology at Memorial Sloan-Kettering from 1991-1999. (Michael C. Dugan. Juan Rosai, Master of the Neoplastic Universe. CAP Today. Sept 1, 2020 p. 12: <http://digital.olivesoftware.com/Olive/ODN/CAPTodays/PrintPages.aspx?doc=CAP/2020/09/01&from=12&to=12&ts=20200929151858&uq=20201014025602>

Wikipedia: https://en.wikipedia.org/wiki/Juan_Rosai

- **Jeffrey E. Saffitz**, Resident, Faculty 1979-2005. Now Mallinckrodt Professor of Pathology at Beth Israel Deaconess: <http://www.scvp.net/saffitz.html>
- **Edward Bryan Smith** (1912-1983), Faculty 1941-1946, Chair, Indiana University 1952-1962. President of International Academy of Pathology (IAP) 1956-1957. Frank C. Coleman, In Memoriam, Edward B. Smith, M.D. 1912-1983, Amer J Clin Path 1985. 83(2): 273-274, <https://doi.org/10.1093/ajcp/83.2.273>

Path to the Future, Dr. Kathleen Warfel Hull, History of the Department of Pathology and Laboratory Medicine, Indiana University. Vol 2, Issue 2, Summer 2007, part 7: The WUMS Invasion: Dr. Edward Smith, pg. 4: <https://archives.iupui.edu/bitstream/handle/2450/10347/Summer2007.pdf?sequence=1>

- **George Dewey Sorenson**, (1927-2016), Faculty 1959-1968. Chair at St. Louis University and then Chair, Dartmouth. Obituary: <https://www.cabotfh.com/obituary/3582005>
- **Harlan Spjut** (1922-2010) Faculty 1955-1962. Acting Chair Baylor (1969-1972): <https://search.proquest.com/openview/fb47777a5af229dbbcefc9713319abf1/1.pdf?pq-origsite=gscholar&cbl=42082>
- **William Ellis Stehbens** (1926-2005) Faculty 1966-1968. He was recruited to be the Head of Pathology at Jewish Hospital. Founding Chair, Wellington Clinical School of Medicine, University of Otago, Australia. <https://www.ccdhb.org.nz/about-us/history/wellington-hospital-smo-archive/appointments-made/1961-1980/medical-admin-clinical-support-services/pathology/stehbens-william-e/>
- **Robert Eugene Stowell** (1914-2011) Faculty ~1939-1944. Chair, University of Kansas, Founding Chair, University of California, Davis; President of USCAP 1959-1960 and recipient of the Gold-Headed Cane Award from ASIP in 1990. https://oac.cdlib.org/findaid/ark:/13030/kt4p3036j5/entire_text/ Lectureships in his name at University of California, Davis and American Registry of Pathology. https://health.ucdavis.edu/pathology/education/grand-rounds_symposia/path-symposia/stowell/index.html

- **Wilbur A. Thomas** (1922-2011) Faculty 1953-1959, then Chief pathologist at Albany Medical College for 31 years. <https://www.legacy.com/amp/obituaries/timesunion-albany/153630277>
- **Thomas W. Tillack**, M.D., Faculty 1970-1976, then Chair University of Virginia <https://med.virginia.edu/pathology/contact/thomas-w-tillack-m-d/>
- **Frank M. Townsend** (1914-2001), Faculty 1945, Chair University of Texas, San Antonio 1972-1986 also well known in Clinical Pathology. Obituary: <https://www.legacy.com/obituaries/sanantonio/obituary.aspx?n=frank-m-townsend&pid=88819224>
- **Paul Allen Wheeler** (1903-1949). Faculty 1937-1943. Chair, Baylor 1944-1949: <https://www.txannin.org/memorial/08550/paul-allen-wheeler>

There are also notable individuals who were involved with Pathology at Jewish Hospital before the merger with Barnes Hospital in January 1996. These include the Pathologists-in-Chief at Jewish Hospital:

- a) Samuel H. Gray (1897-1949) Chief at Jewish Hospital from 1930-1949. He also was at City Hospital for some of this time and was involved in the pancreatitis study group with Michael Somogyi (Table 12A).
- b) Herman Blumenthal (1913-2007) was Chief from 1949 to 1965 and after retirement was Professor of Gerontology in the Department of Psychology at Washington University from 1971 to 1996. For a short time he was in Geriatric Medicine at St. Louis University.
- c) William E. Stehbens (1926-2005) noted previously was Faculty and Chief from 1966 to 1968.
- d) Robert C. Ahlvin (1928-2009), Faculty 1957 to 1970; Chief 1968 to 1971.
- e) Erwin R. Rabin– Faculty 1968-1974; Acting Chief 1971 to 1974
- f) Gus Davis – Faculty 1969-1981; Acting Chief 1974-1975.
- g) Carl W. Pierce, Faculty 1976 to 1991; Chief 1975 to 1986.
- h) Steve Teitelbaum (Table 8D), Chief 1987 to 1996, when Barnes-Jewish Hospital was created.

Also notable are the Silberbergs; Martin (1895-1966) and Ruth (1906-1997): <http://beckerexhibits.wustl.edu/mig/bios/silberberg.html>. They were both educated at the University of Breslau. Martin had first come to WUSM in 1928-29 and worked with Leo Loeb in 1933-34. They both held positions in Pathology at the Jewish Hospital in Breslau and left Germany around 1934 to Dalhousie in Halifax and NYU and then settled in St. Louis in 1944. Their research primarily concerned the skeletal system and aging; work Ruth continued after Martin's death in 1975: <http://beckerexhibits.wustl.edu/oral/interviews/silberberg.html>

There are and have been many notable members of the department who have not had major administrative positions within the department or gone elsewhere as Chairs.

One such notable individual who was identified as such in 1965 by Margaret Smith as a superb anatomic pathologist is John Kissane.

John M. Kissane (1920-2018) A.B. University of Rochester 1948; M.D. WUSM 1952 (Faculty 1958-2003) (Louis P. Dehner, In Memoriam: John M. Kissane, M.D. (1928-2018) Pediatric and Developmental Pathology 2019: 22(1) pp. 3-4:

<https://journals.sagepub.com/doi/full/10.1177/1093526618821259>

He was a pioneer in pediatric pathology (the 10th President of the Society for Pediatric Pathology) and also in renal pathology where he helped organize the Renal Pathology Society in 1977: <https://renalpathsoc.wildapricot.org/RPS-History>.

He was one of the last true renaissance people (James Kissane and John M. Kissane, Sherlock Holmes and the Ritual of Reason:

https://www.jstor.org/stable/2932630?seq=1#metadata_info_tab_contents) and a go-to person in the department for many years.

A tragedy in this division occurred on February 12, 1989 when Steve Dresler (Faculty from 1984) died of a heart attack at age 39. Dresler was a very promising cancer researcher and educator: Washington University Record, Feb 16, 1989, page 3:

https://digitalcommons.wustl.edu/record/470/?utm_source=digitalcommons.wustl.edu%2Frecord%2F470&utm_medium=PDF&utm_campaign=PDFCoverPages

Table 8

Chiefs of Surgical Pathology

1948-1973	Lauren Vedder Ackerman, M.D.
1973-1986	Walter Carl Bauer, M.D.
1987-1988	Robert W. McDivitt, M.D.
1989-2006	Louis Powell (Pepper) Dehner, M.D. (name changed to Anatomic Pathology 1991)
2007-2013	Peter Allen Humphrey, M.D., Ph.D. (2008 name changed to Anatomic and Molecular Pathology in 2008)
2014-2018	Steve L. Teitelbaum, M.D.
2019-2020	John David Pfeifer, M.D., Ph.D.
2020-	Joseph Perry Gaut, M.D., Ph.D.

Table 8A

Lauren Vedder Ackerman, M.D. (1905-1993)

1927	B.S., Hamilton College
1932	M.D., University of Rochester
1932-1936	Internal Medicine Training, University of California, San Francisco
1936-1939	Path Resident, Pondville State Cancer Hospital (Shields Warren)
1939	Faculty, Pathology, UCSF
1940-1948	Ellis Fischel Cancer Hospital, Columbia, Missouri
1942-1973	Faculty, Pathology, WUSM
1948-1965	Faculty, Surgery WUSM
1973-1993	Faculty, Stonybrook
1986	Lifetime Achievement Award (Gold-Headed Cane) from ASIP



Notes:

Had TB as a medical student with periodic episodes later in life. Residents in Pathology at WUSM were known to be doing rotations with him when he was in Columbia, MO. Wrote two textbooks: Cancer: Diagnosis, Treatment and Prognosis. 1947 with J. A. Del Regat and Surgical Pathology. 1953. Received the Gold-Headed Cane Award (Lifetime Achievement) from ASIP in 1986.

The Surgical Pathology Laboratory at The Barnes Hospital was named in his honor in 1990.

References:

Richard L. Kempson: A Tribute to Lauren V. Ackerman. Cancer 1993; 22(11), pp. 3137-3138: <https://acsjournals.onlinelibrary.wiley.com/doi/pdf/10.1002/1097-0142%2819931201%2972%3A11%3C3137%3A%3AAID-CNCR2820721102%3E3.0.CO%3B2-R>

Wikipedia: https://en.wikipedia.org/wiki/Lauren_Ackerman

Obituary: N.Y. Times: <https://www.nytimes.com/1993/07/30/obituaries/lauren-ackerman-88-professor-and-an-author-of-medical-texts.html>

Table 8B

Walter Carl Bauer, M.D., (1925-2008)

1946	B.S., Ohio State
1954	M.D., WUSM
1955-1989	Resident, Fellow, Faculty-Pathology, WUSM
1973-1987	Chief, Surgical Pathology Division
1989-2008	Clinical Professor, St. Louis University



Notes:

Worked with the Greater St. Louis Citizens Committee for Nuclear Information which led the St. Louis Baby Tooth Survey from 1959 to 1970:

<http://beckerexhibits.wustl.edu/dental/articles/babytooth.html>. Showed high amounts of strontium-90 in the teeth, which indicated that fallout from nuclear tests was brought by rain to the grass which cows ate and then passed in their milk to babies. It led to the Nuclear Test-Ban Treaty of 1963.

References:

Obituary: St. Louis Post Dispatch, Feb 4, 2008 plus comments by Mark Hurt, M.D.:

<https://www.findagrave.com/memorial/24393078/walter-carl-bauer>

Table 8C

Robert W. McDivitt, M.D. (1931-2021)

1949-1952	Harvard College
1951-1956	M.D. Yale Medical School
1956-1960	Intern & Resident, Osler Medicine Service and Pathology Resident, Johns Hopkins Hospital
1960-1961	Surgical Pathology Fellow, Memorial-Sloan Kettering Cancer Institute
1960-1961	Chief Resident in Pathology, ACS Fellow, Memorial-Sloan Kettering Cancer Institute
1962-1964	U.S. Air Force, Scott AFB, IL
1964-1971	Associate Attending Pathologist, Memorial-Sloan Kettering Cancer Institute and the James Ewing Hospital, NYC
1968-1971	Director of Surgical Pathology, the New York Hospital
1968-1971	Associate Professor of Pathology and Surgery, Cornell University School of Medicine
1971-1979	Professor of Pathology and Director of Surgical Pathology, University of Utah
1979-1988	Professor of Pathology, Washington University School of Medicine
1979-1987	Director, Division of Anatomic Pathology, Jewish Hospital of St. Louis
1987-1988	Director, Division of Anatomic Pathology, Barnes Hospital
1987-1989	Chief, Surgical Pathology, Barnes Hospital
19095-2003	Senior Lecturer, University of the West Indies, Trinidad
2005-2010	Faculty, University of Utah, Huntsman Cancer Center



Notes:

Author of Tumors of the Breast (Atlas of Tumor Pathology) AFIP 1967 and Breast (Int Acad of Pathology) 1984.

Reference:

Obituary: <https://www.legacy.com/us/obituaries/bostonglobe/name/robert-mcdivitt-obituary?id=23721749>

<https://ustarter.utah.edu/o/university-of-utah-39/i/ustarter/s/robert-mcdivitt-endowment>

Table 8D

Louis Powell (Pepper) Dehner, M.D. (1940-)

1962	A.B, Washington University
1966	M.D., WUSM
1966-1971	Resident, Fellow, Pathology, WUSM
1971-1974	Faculty, WUSM
1974-1989	Faculty, University of Minnesota
1989-	Faculty, WUSM
1989-2006	Chief, Surgical Pathology, WUSM



Notes:

Has received a number of awards and named lectureships and has been on the Board of Editors of a number of journals. Board certified in AP, dermatopathology and Pediatric Pathology. Published 1st Pediatric Surgical Pathology text in 1975 and was President of the United States and Canadian Academy of Pathology (USCAP) in 2002-3. First to identify pleuropulmonary blastoma in children.

References:

Department C.V.

WashU Distinguished Clinician Award: <https://pathology.wustl.edu/people/louis-p-dehner-md/>

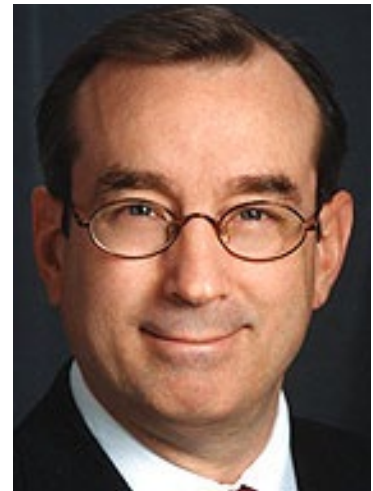
Dartmouth Lecture: Pathology and Laboratory Medicine Grand Rounds 2018:
<https://news.dartmouth.edu/events/event?event=51058#.X-zlqBZOIKc>

Dehner enjoys life “peppered” with surprise. WUSM, The Source Aug 27, 2010:
<https://source.wustl.edu/2010/08/dehner-enjoys-life-peppered-with-surprise/>

Table 8E

Peter Allen Humphrey, M.D., Ph.D. (1956-)

1978 B.A., University of Kansas, Kansas City
1984 M.D., Ph.D., University of Kansas, Kansas City
1985-1992 Resident, Fellow, Faculty, Duke University
1992-2013 Faculty, WUSM
**2007-2013 Chief, Surgical Pathology and first Ladenson
 Professor of Pathology and Immunology, WUSM**
2014- Faculty, Yale



Notes:

Editor of First Edition of *The Washington Manual of Surgical Pathology: Department of Pathology and Immunology, Washington University School of Medicine, St. Louis, MO* in 2008.

References:

Yale C.V.
Department C.V.
https://medicine.yale.edu/profile/peter_humphrey/

Table 8F

Steven Lazarus Teitelbaum, M.D. (1938-)

1960	AB, Columbia
1964	M.D., WUSM
1964-1965	Intern, Pathology, WUSM
1965-1967	Resident, Medicine, NYU
1967-	Fellow, Faculty, WUSM
1987-	Wilma and Roswell Messing Professor of Pathology, WUSM
2014-2017	Chief, Anatomic and Molecular Pathology, WUSM



Notes:

President or Board of Directors of a number of professional organizations. Has received a variety of academic awards and honors and named lectureships, including the King Faisal International Prize for Medicine in 2019. Past President of FASEP 2002. A pioneer in elucidating the function and regulation of the osteoclast.

References:

Department C.V.

King Faisal Internal Prize in Medicine, 2019: <https://kingfaisalprize.org/professor-steven-l-teitelbaum/>

216 Jewish Hospital of St. Louis, May/June 1982, Pages 12-13, Conquering Bone Disease, p. 12-13: https://digitalcommons.wustl.edu/bjc_216/158/

Washington University School of Medicine Distinguished Service Award, 2007: <https://medicine.wustl.edu/news/about/faculty-recognition/alumni-association-awards/2007-2/steven-l-teitelbaum-md/>

Table 8G

John David Pfeifer, M.D., Ph.D.

1981	B.A., University of California, San Diego
1987	Ph.D., University of California, San Diego
1988	M.D., University of California, San Diego
1988-	Resident, Faculty, Pathology, WUSM
2010-2020	Vice Chair Clinical Affairs, Pathology and Immunology, WUSM
2017-2020	Interim Chief, Anatomic and Molecular Pathology, WUSM



Notes:

Editorial Board, Modern Pathology, Am J Clin Path

References:

Department C.V.

<https://pathology.wustl.edu/people/john-pfeifer-md-phd/>

Table 8H

Joseph Perry Gaut, M.D., Ph.D.

1996 A.B., Washington University
2004 M.D., Ph.D., WUSM (Jay Heinecke)
2004-2005 Intern, Surgery, WUSM
2005-2007 Postdoc, WUSM (Jack Ladenson)
2007-2009 Resident, Anatomic Pathology, MGH
2009-2014 Resident, Faculty, WUSM
2014 Nephropathologist, Arakana Laboratories
2014-present Faculty, WUSM



2020-present Chief, Anatomic and Molecular Pathology, WUSM

2022- Ladenson Professor of Pathology, WUSM

Notes:

Member of a number of professional societies and given a number of invited lectures.

References:

Department C.V.

WU Division of Nephrology: <https://nephrology.wustl.edu/joseph-gaut-renal-pathologist/>

Division of Neuropathology

Neuropathology as a field at WUSM can be traced to the reorganization of the medical department in 1910. Ernest Sachs, M.D. (1879-1958) came to WUSM in 1911. He was the first American specifically trained in neurosurgery and then the first Professor of Neurosurgery in 1919. Sachs made instruction in neuropathology an integral part of the neurosurgery residency and fellowship programs and knowledge of surgical neuropathology continues to be part of neurosurgery training. Neurosurgery has continued his efforts of excellence (Samuel H. Greenblat, Local History, National Leadership and the “St. Louis Mafia,” book review of Robert L. Grubb Jr., Neurosurgery at Washington University: A Century of Excellence. St. Louis, Missouri, The Washington University, 2011. Brain 2013; 136: 355-358: <https://academic.oup.com/brain/article/136/1/355/430240>. Appendix 3, pages 327-330 of this book, reviews Neuropathology at Washington University from 1911-1991. Also the roots of neuroscience at WUSM go back to one of the original department Chairs, Joseph Erlanger, MD in Physiology, who received the Nobel Prize in 1944 for work with nerve transduction.

The teaching of Neuropathology has had a circuitous route as regards its academic home. It was taught as part of Neurology in Medicine, then by the section of Neurology and Psychiatry in Medicine, then Department of Histology and Neuroanatomy (Steven Walter Ronson) starting in 1926; followed by the Department of Neuropsychiatry (David McKenzie Rioch) in 1938. It also later found a second home in the Anatomy Department related to the electron microscopy expertise in that department.

It was first taught in the pathology department by William Osborn Russell, around 1939. Russell was later the founding Chair of pathology at M.D. Anderson (from 1948 to 1977), and can be considered as the first Chief of the Neuropathology division. The Chiefs of this division are noted in Table 9. Russell was followed by William English Smith, Jr., who later went to the

University of Virginia as Chair of Pathology. Sarah Amanda Luse was neuropathologist from 1956-1966. She was also Acting Chair of Anatomy 1963-1964.

In 1968, Richard Maurice Torack and William W. Schlaepfer came from Cornell, with Torack as Chief. Torack was an original member of the Tuesday Brown Bag Series organized by Dr. Leonard Berg in the Department of Neurology, discussing what was known and unknown about dementia. This activity has been credited as contributing to establishing The Alzheimer Disease Research Center by John C. Morris, its director. Schlaepfer studied neuro filaments and the role of RNA in motor neurodegeneration and went to the University of Pennsylvania in 1979. James Smith Nelson (1933-2016) came from St. Louis University in 1975 with an appointment in Pathology and Pediatrics. In the mid-1970's, the Neuropathology fellowship was accredited and has continued to this day. William F. Hickey followed Nelson from 1988 to 1992 and then Robert E. Schmidt from then until the present.

Past Chiefs of Neuropathology, William Osborn Russell, David English Smith, Jr., James Smith Nelson, and William F. Hickey, went on to be Chairs of Pathology departments elsewhere. In addition, two other members of the Neuropathology division went on to be department Chairs: Steven L. Carroll MD, PhD, (Faculty 1994-1997) became Chair in 2014 of the Department of Pathology and Laboratory Medicine at Medical University in South Carolina: <https://profiles.healthsciencessc.org/Steven.Carroll/> , and Kevin Aaron Roth, MD, PhD, (Faculty 1990-2002) Chair at UAB, and then Columbia starting in 2015: <https://www.cuimc.columbia.edu/news/dr-kevin-roth-named-chair-pathology-cell-biology-and-pathologist-chief>. Bob Schmidt, the current and longest serving Chief remains an esteemed member of the faculty for whom the airbridge from the West Building to BJCIH is named.

Table 9

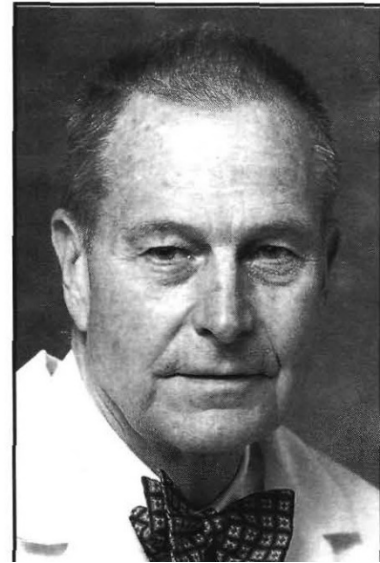
Chiefs of Neuropathology Division

1939-1947	William Osborn Russell, M.D. (1910-1997)
1950-1955	David English Smith, Jr., M.D. (1920-2017)
1956-1966	Sarah Amanda Luse, M.D. (1918-1970)
1968-1974	Richard Maurice Torack, M.D. (1928-2009)
1975-1987	James Smith Nelson, M.D., (1933-2016)
1988-1992	William Frederick Hickey, M.D.
1993-	Robert E. Schmidt, M.D., Ph.D.

Table 9A

William Osborn Russell (1910-1997)

1933	A.B., Stanford
1937	M.D., Stanford
1937-1938	Resident, Fellow; Path, Neuropath, Boston University
1939-1947	Faculty, WUSM
1948-1977	Founding Chair of Pathology, M.D. Anderson
1977-1987	Director of Pathology, North Ridge Medical Center, Fort Lauderdale, FL



Notes:

President of United States and Canadian Academy of Pathology (USCAP) which is part of the International Academy of Pathology 1957-1958, and the American Society of Clinical Pathologists (ASCP) 1964-1965

References:

Steven I. Hajdu. William O. Russell, M.D. (1910-1997). *Amer J Clin Pathol* 1998; 109(4); pp. 492-493. <https://academic.oup.com/ajcp/article/109/4/492/1757907>

Ellen B. Koch. Reflections: Historical Perspectives on Pathology in Houston and Galveston 1998. <https://digitalcommons.library.tmc.edu/cgi/viewcontent.cgi?article=1006&context=ebooks> page 25 of the download.

Table 9B

David English Smith, Jr. (1920-2017)

1941	B.A., Central Methodist College, Fayette, MO
1944	M.D., WUSM
~1944-1947	Military
1948-1955	Faculty, WUSM
1955-XXXX	Chair, Department of Pathology, UVA
XXXX-XXXX	Board of Medical Examiners
1981-xxxx	Pathology, Associate Dean, Tulane
xxxx-2014	Emeritus, UTMB, Galveston



Notes:

Received many awards related to medical education from UVA, UTMB, ASCP and WUSM.

President of USCAP 1964-1965.

References:

Obituary: <https://www.dignitymemorial.com/obituaries/austin-tx/david-smith-7642214>

Philip J. Daroca, Jr, MD. A History of the Pathology Department: 2005-Tulane:
<https://medicine.tulane.edu/departments/pathology-laboratory-medicine/history> page 6 under Dr.
Emanuel Shapira.

Obituary Outlook Magazine: Summer 2018. Obituaries. David E. Smith, Jr., M.D.:

<https://medicalalumni.wustl.edu/alumni/wusm-updates/>

Table 9C

Sarah Amanda Luse (1918-1970)

1940	A.B., Rockford College
1940-1945	Technician in electroencephalography, Mayo Clinic
1949	M.D., Western Reserve
1949-1950	Intern, Medicine, Johns Hopkins
1950-1953	Resident, Pathology, Western Reserve
1953-1954	Neuropathology, Mayo Medical School
1954-1967	Fellow, Faculty; Anatomy, Pathology, WUSM
1963-1964	Acting Chair, Anatomy, WUSM
1956-1966	Neuropathologist, WUSM
1967-1970	Neuropath, Columbia University



Notes:

Came to Anatomy Department a year or two before Paul Lacy; both from Mayo Clinic.

References:

Women in Medicine at Washington University School of Medicine:

<http://beckerexhibits.wustl.edu/women/luse.htm>

Edward G. Dempsey, Sarah Amanda Luse (1918-1970). Proc of the Amer Assoc of Anatomists, 84th Meeting (1972). Anat Rec. 171: pp. 130-131. <https://onlinelibrary-wiley-com.beckerproxy.wustl.edu/doi/epdf/10.1002/ar.1091710108>

James Eckman, Sarah Amanda Luse 1918-1970. Neurology 1971: 211: p. 391
<https://n.neurology.org/content/21/4/391>

Table 9D

Richard Maurice Torack (1928-2009)

1948	B.S., Seton Hall
1952	M.D., Georgetown
1952-1956	Flight Surgeon, USAF
1956-1960	Training, Pathology, Neuropathology, Montefiore Hospital, New York
1961-1962	Yale
1962-1967	Cornell
1968-1992	Faculty, WUSM
1968-1974	Chief Neuropathology, WUSM
1992-2000	Clinical Professor, WUSM



Notes:

An original member of the Tuesday Brown Bag series organized by Leonard Berg to discuss dementia. This series led to the Memory and Aging Project to the Alzheimer Disease Research Center at WUSM led by John Morris. Author of the 1981 book, "Your Brain is Younger than You Think: A Guide to Mental Aging."

References:

Washington University in St. Louis. The Source: Obituary:

<https://source.wustl.edu/2009/02/obituary-torack-retired-alzheimer-disease-researcher-81/>

St. Louis Public Radio: Obituary: <https://news.stlpublicradio.org/health-science-environment/2009-01-29/obituary-of-dr-richard-maurice-torack-leader-in-dementia-research>

Table 9E

James Smith Nelson (1933-2016)

1957	M.D., St. Louis University
1959-1960	Neuropathology training, Columbia University
1961-1963	National Hospital for Neurology and Neurosurgery, London
1964-1973	Faculty, St. Louis University
1973-1987	Faculty, WUSM
1975-1987	Chief, Neuropathology, WUSM
1987-1989	Neuropathology, Henry Ford Hospital
1989-2000	Neuropathology, L.S.U.
1990-1994	Chair, Pathology, AFIP
2001-2009	Pacific Health Research Institute, Honolulu



Notes:

Studied neuropathology of Vitamin E deficiency and sickle cell disease and authored or co-authored several books, including "Principles and Practice of Neuropathology." Started the neuropathology training program at WUSM in 1975. "Had a quiet and devious sense of humor" – Bob Schmidt.

References:

Robert E. Schmidt: James Smith Nelson, M.D. March 19, 1933 – September 21, 2016. Journal of Neuropathology & Experimental Neurology 2017: 76(1): p. 67:
<https://academic.oup.com/jnen/article/76/1/67/2930498?login=true>

Table 9F

William Frederick Hickey, M.D.

1972	B.S., M.A., Tufts University
1977	M.D., University of Vermont
1977-1981	Resident, Brigham
1981-1988	Faculty, University of Pennsylvania
1988-1992	Faculty, Chief, Neuropathology WUSM
1992-2009	Faculty, Chair of Pathology 1992-2007, Dartmouth
2000-2008	Sr. Associate Dean for Academic Affairs, Dartmouth



Notes:

Active in the Governance of the College of American Pathologists (CAP) and its Foundation.

Elected to the CAP Board of Governors, 2011-2014:

http://www.captodayonline.com/Archives/1011/1011j_cap_annual_stated.html

References:

Pathology Department Dartmouth:

<https://geiselmed.dartmouth.edu/faculty/facultydb/view.php?uid=967>

Dartmouth Medicine Magazine Winter 2000: New deanships will augment the DMS administrative lineup https://dartmed.dartmouth.edu/winter00/html/vs_deanships.shtml

Table 9G

Robert Edward Schmidt, M.D., Ph.D.

1969	A.B., Washington University
1976	M.D., Ph.D., WUSM
1976-1980	Resident, Fellow, WUSM
1988-	Faculty, WUSM
1992-	Chief, Neuropathology, WUSM
2021	Meritorious Contributions to Neuropathology Award from the American Association of Neuropathologists



Notes:

Member of a number of editorial boards and organizations. Bridge from West Building to Barnes Jewish Institute of Health Building named for him. He was in the first group of MSTP students at WUSM in 1969 when the program began. Recipient of a number of awards.

References:

Department C.V.

<https://pathology.wustl.edu/people/robert-schmidt-md-phd/>

Immunobiology Division

Immunobiology as a field has been at Washington University since before the reorganization of the medical department in 1910. Medical student courses in infection and immunity and the study of serum reactions (a wet lab course in applied immunology with emphasis on syphilis, a major problem at the time) were taught even before Opie came as Chair of Pathology. Opie himself studied immune responses and in 1928 was the president of the American Association of Immunologists (AAI). Likewise, Loeb utilizing tissue transplantation studied aspects of histocompatibility.

There have been other notable members of the medical school faculty who were immunobiologists at WUSM before the formation of the Immunobiology division. They are highlighted in Tables 10A-J.

When the Pathology and Bacteriology department changed its name to Pathology when Loeb became Chair, a new Department of Bacteriology and Immunology evolved from 1928 until 1952. Its chair was Jacques Jacob Bronfenbrenner (1883-1953) (Table 10A). He was also president of AAI, 1942-1946 (annual elections were suspended during WWII).

After Bronfenbrenner retired in 1952, the Department of Bacteriology and Immunology became the Department of Microbiology with Arthur Kornberg as Chair until 1999, when he went to Stanford, the same year he shared the Nobel Prize with former faculty member, Severo Ochoa: <https://www.nobelprize.org/prizes/medicine/1959/kornberg/biographical/>. Immunobiology focus shifted to an Immunology division of the Medicine department with Robert Glaser as Head (Table 10B). When Glaser left WUSM, he sold his house in Webster Groves to an up and coming faculty member, Paul Lacy (Table 7H), which was the venue for an annual Pathology department holiday party when Paul was Chair. Around the same time that Glaser was Head of the Immunology division, Frank Dixon (Table 10C) was on the Pathology faculty. Dixon was later a mentor to Emil Unanue at Scripps and a Lasker winner 20 years before Unanue.

Following Glaser, Herman Eisen (Table 10D) was recruited as Head of Dermatology in Medicine by Carl Moore. Eisen remained in the Medicine Department until 1961 when he became Chair of the Microbiology department and Charlie Parker (Table 10E) became Chief of Allergy and Immunology in Medicine. From 1955 to 1963, Jack Strominger (Table 10F) was a member of the Biological Chemistry and Pharmacology departments. Donald Shreffler (Table 10G) came from Michigan to be Chair of Genetics in 1975 and current faculty member John Atkinson (Table 10H) started at WUSM.

After Eisen left for the MIT Center for Cancer Research, the Molecular Microbiology department was renamed Microbiology and Immunology and Joe Davie (Table 10I) became Chair in 1975. Davie left in 1986 for the pharmaceutical company, G.D. Searle Company, a Monsanto owned company, which is now part of Pfizer. Davie played a major role in the early development of the Division of Laboratory Medicine (see LGM section).

Immunobiology completed its tour of WUSM and returned to Pathology in 1996 when Emil Unanue (Table 7I) came as Chair and the department was renamed Pathology and Immunology in 2001. <https://pathology.wustl.edu/divisions/immunobiology/immunobiology-history/> . Around this time, Wayne Yokoyama (Table 10J) came as Head of the Rheumatology Division of Medicine.

The Immunobiology Division has expanded since its start in Pathology and this division accounts for all but one (Jeff Gordon) of the six faculty members' (Marco Colonna, Ken Murphy, Bob Schreiber, Emil Unanue, Skip Virgin and Jeff Gordon) with current or recent primary appointments in the department who are currently members of the National Academy of Sciences (NAS).

Besides the notable individuals in Tables 10A-J, there have been immunobiologists in the Pathology and Immunology Department before the creation of the Immunobiology Division who have gone on to Chair departments of Pathology or equivalent elsewhere: Dick Lynch (1934-

2009), Faculty 1971-1980, went to the University of Iowa as Chair of Pathology in 1981 until 1999 and retired in 2004. He was President of ASIP in 1995. (Mark E. Sobel, Richard (Dick) Lynch, M.D. (1934-2009) *Amer J Pathol* 2010; 177: 2-3: <https://www.sciencedirect.com/science/article/pii/S0002944010600557>, <https://www.legacy.com/obituaries/press-citizen/obituary.aspx?pid=173913250>); Cliff Harding, (Faculty 1990-1993) has been Chair of Pathology at Case Western Reserve since 2008 (<https://thedaily.case.edu/department-pathology-chair-renowned-immunology-physician-scientist-clifford-harding-named-distinguished-university-professor/>). Since the creation of the Division of Immunobiology, Andrey Shaw (Faculty 1991-2014) (Table 11B) went to Genentech in 2015 and is now a senior fellow there in Immunology-Oncology and Andy Chan (Faculty 1994-2002) <https://www.gene.com/scientists/our-scientists/andrew-chan> is also at Genentech as a Senior VP Research Biology.

Past presidents of the American Association of Immunologists associated with WUSM include Gene Lindsay Opie (1928-1929) (Table 7A), Jacques Jacob Bronfenbrenner (1942-1946) (Table 10A), Joseph Edward Smadel (1958-1959): https://en.wikipedia.org/wiki/Joseph_Edward_Smadel (medical student), Edwin H. Lennette (1966-1967): <https://www.aai.org/About/History/Past-Presidents-and-Officers/EdwinHLennette> (shared a lab for a year with Margaret Smith (Table 7D)), Herman N. Eisen (1968-1969) (Table 10D), Frank J. Dixon (1971-1972) (Table 10C), Donald C. Shreffler (1987-1988) (Table 10G), Roger Perlmutter (1999-2000): <https://www.aai.org/About/History/Past-Presidents-and-Officers/RogerMPerlmutter>; <https://outlook.wustl.edu/how-i-got-my-start/> (medical student) Oral History Transcript (recently retired Head of Research at Merck), Paul M. Allen (2005-2006) (Table 11D), Dan R. Littman (2015-2016): <https://www.aai.org/About/History/Past-Presidents-and-Officers/DanRLittman> (medical student), and Wayne Yokoyama (2017-2018) (table 10J).

The Division of Immunobiology has had a few different names and structures since its activities became formalized when Emil Unanue became Chair of Pathology in 1985. It began with

Emil and Bob Schreiber as Co-chiefs (The Chiefs of the Immunobiology Division are noted in Table 11), then Emil as Head of The Center for Immunology. After another year with Schreiber as Chief, Andrey Shaw was Chief from 2002 until he left for Genentech in 2015. The name of this Division became the Division of Immunobiology in 2008. Gwendalyn Randolph was Chief from 2015 to 2017, then Paul Allen and Robert Schreiber have been Interim Chiefs. These individuals are noted in Tables 11A-D.

Table 10A

IMMUNOBIOLOGISTS BEFORE THE IMMUNOBIOLOGY DIVISION AT WUSM

-Opie, Loeb – see Chairs of Pathology and Immunology (Table 7A and Table 7B)

Jacques Jacob Bronfenbrenner (1883-1953)

1907-1909	Worked in Paris with Elie Metchnikoff at Pasteur Institute (Nobel Prize in 1908)
1909-1913	Sponsored by Simon Flexner as a research fellow at Rockefeller
1912	Ph.D., Columbia
1913-1917	Head, research and diagnostic laboratories, Western Pennsylvania Hospital
1917-1923	Faculty and Public Health student, Harvard
1919	Dr.P.H., Harvard
1923-1928	Associate Member, Rockefeller
1928-1952	Faculty and Chair, Department of Bacteriology and Immunology, WUSM
1952-1953	Research Professor, Bowman Grey School of Medicine



Notes:

A follower of Leon Trotsky in the abortive revolution of 1905, he fled the Tsarist regime in Russia and went to Paris.

His research centered on purification and quantification of bacteriophages and his laboratories were in the West Building. Recruited a number of successful faculty, the most notable being Alfred Hershey (Nobel Prize-1969). Bronfenbrenner was president of AAI 1942-1946. His one year term extended due to WWII.

References:

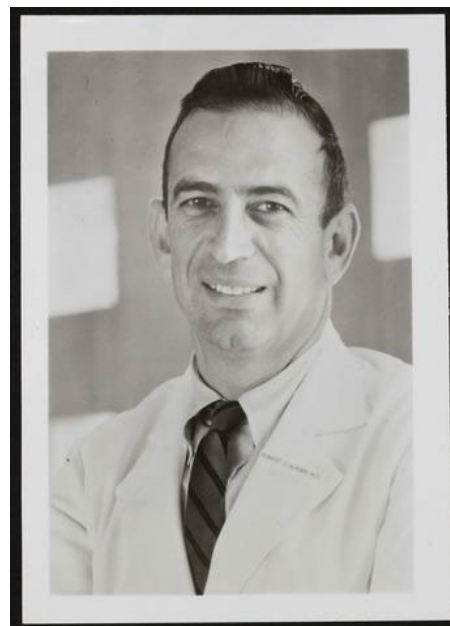
Paul G. Anderson. Jacques Jacob Bronfenbrenner (1883-1953). Medical Journeys, Becker Exhibits: <http://beckerexhibits.wustl.edu/mig/bios/bronfenbrenner.html>

The American Association of Immunologists: Jacques J. Bronfenbrenner, Ph.D., Brief Bio: <https://www.aai.org/About/History/Past-Presidents-and-Officers/JacquesJBronfenbrenner>

Table 10B

Robert Joy Glaser, M.D. (1918-2012)

1940	B.S., Harvard
1943	M.D., Harvard
1944-1945	Intern, WUSM
1945	Resident, Brigham
1945-1956	Resident, Fellow, Faculty, WUSM
1957-1962	Dean, University of Colorado Medical School
1963-1965	President of the Affiliated Hospital Center – Harvard
1965-1970	Vice President for Medical Affairs and Dean, Stanford Medical School
1970	Founding member, Institute of Medicine
1970-1972	Commonwealth Fund, New York
1972-1983	CEO, Henry J. Kaiser Family Foundation
1984-1997	Director for Medical Science, Lucille P. Markey Charitable Trust



Notes:

Grew up in the University Hills area of University City, MO (St. Louis) and attended Flynn Park Elementary School, the same school that the children of department members Ladenson and Teitelbaum attended. When Glaser left St. Louis, he sold his home in Webster Groves to Paul Lacy, later Chair of Pathology. Glaser sat on many boards and received numerous award and honors. Glaser was an Assistant Dean for part of 1947 and 1953 and an Associate Dean in 1956-7. His mother-in-law, Aphrodite Jannopoulo Hofsommer, was the first woman admitted to WUSM in 1918 and received her medical degree in 1923: <https://becker.wustl.edu/news/women-come-to-wusm/>

References:

Jeremiah A. Barondess. Robert Joy Glaser, M.D., Transactions of the American Clinical and Climatological Association. 2013; 124: 110-113.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3715937/>

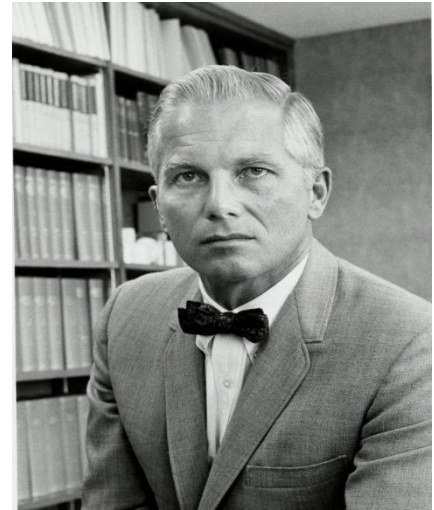
Obituary – Stanford: <https://med.stanford.edu/news/all-news/2012/06/former-medical-school-dean-robert-glaser-dies-at-93.html>

Oral History Transcript: Robert J. Glaser 1985 – WUSM: <http://beckerexhibits.wustl.edu/oral/transcripts/glaser.html>

Table 10C

Frank James Dixon (1920-2008)

1943	B.S., M.D., University of Minnesota
1943-1946	U.S. Marine Medical Corps
1946-1948	Research Assistant, Harvard (Shields Warson)
1948-1951	Faculty, WUSM
1951-1960	Chair, Pathology, University of Pittsburgh
1961-1973	Chair, Experimental Pathology, Scripps Clinic and Research Foundation
1971	Elected National Academy of Science
1974-1986	Director, Scripps Research Institute
1975	Lasker Award



Notes:

President of AAI 1971-1972. Was a mentor to Emil Unanue, amongst many others. He received the Lasker Award in 1975, exactly 20 years before Emil received it.

References:

Michael B.A. Oldstone. Frank James Dixon, 1920-2008. National Academy of Sciences 2009:
<http://www.nasonline.org/publications/biographical-memoirs/memoir-pdfs/dixon-frank-james.pdf>

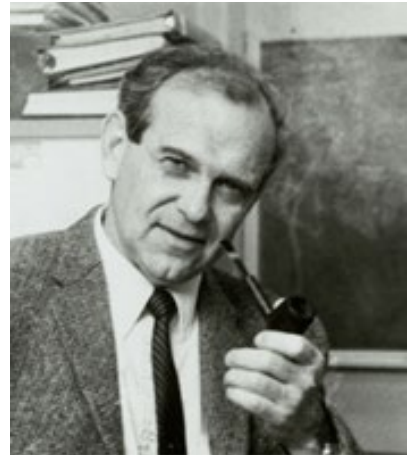
The American Association of Immunologists-Frank J. Dixon, MD., Brief Bio:
<https://www.aai.org/About/History/Past-Presidents-and-Officers/FrankJDixon>

Stephen Pincock. Frank James Dixon. Lancet 2008, 371(9616): p. 894:
[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(08\)60403-1/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(08)60403-1/fulltext)

Table 10D

Herman Nathaniel Eisen (1918-2014)

1939	A.B., New York University
1943	M.D., New York University
1944-1946	Resident, Pathology, Columbia (Michael Heidelberger)
1948-1955	Fellow, Faculty NYU
1955-1960	Faculty: Chief, Dermatology, WUSM
1960-1973	Chair, Department of Molecular Microbiology, WUSM
1968-1969	President, AAI
1969	Elected National Academy Sciences
1973-1985	Founding Member, MIT, Center for Cancer Research
1989-2014	Emeritus, MIT
1997	Lifetime achievement Award, AAI



Notes:

Studied affinity maturation of antibodies and then T-cells and cell-mediated immunity.

References:

Oral History Transcript: The American Association of Immunologists, 2012:
https://www.aai.org/AAISite/media/About/History/OHP/Transcripts/Trans-Inv_003-Eisen_Herman_N-2012_Final.pdf .

Obituary: <https://news.mit.edu/2014/herman-eisen-obituary-1113>

Herman N. Eisen and Sondra Schlesinger. Remembrance of Immunology Past: Conversations with Herman Eisen. *Annu Rev Immunol* 2015; 33: 1-28 (Recommended):
<https://www.annualreviews.org/doi/full/10.1146/annurev-immunol-111214-122349>

Arup K. Chakraborty and Emil R. Unanue. Herman N. Eisen, M.D. (1918-2014): Scholar, Gentleman, and AAI President (1968-1969) *J. Immunol* 2015; 194: 2451-2452.
<https://www.jimmunol.org/content/194/6/2451>

Table 10E

Charles Ward Parker, M.D., (1930-2013)

1953	B.S., M.D., WUSM
1954-1956	U.S. Navy
1957-1998	Resident, Faculty, WUSM
~1960-1997	Founding Head, Division of Allergy and Immunology, WUSM
1997-2013	Professor Emeritus, WUSM



Notes:

Life Master Bridge player. Developed penicillin skin test and studied the relationship of leukotriene to immune response. He met his wife Mary (Langston) at WUSM in anatomy class. His father was William B. Parker, a long time registrar of WUSM (see Oral History Transcript William Parker). He was a strong supporter of LGM in its early days.

References:

Michael C. Purdy, Obituary: Charles w. Parker, Emeritus Professor of Medicine, 83: The Source, April 24, 2013: <https://source.wustl.edu/2013/04/obituary-charles-w-parker-emeritus-professor-of-medicine-83/>

Obituary: <http://obits.dignitymemorial.com/dignity-memorial/obituary.aspx?n=Charles-Parker&lc=6772&pid=164417355&mid=5507513>

Table 10F

Jack Leonard Strominger, M.D. (1925-)

1944	A.B., Harvard
1948	M.D., Yale
1948-1951	Intern and fellow, WUSM (Oliver Lowry)
1951-1954	National Institute of Health (NIH)
1955-1964	Faculty, WUSM
1964-1968	Chair, Pharmacology, University of Wisconsin
1968-present	Faculty, Harvard
1970	Elected National Academy of Sciences
1975	Elected National Institute of Medicine
1994	Elected American Philosophical Society
1995	Lasker Award (with Emil Unanue)
1999	Japan Prize
2020	Distinguished Fellow, AAI



Notes:

His many awards including the Lasker Award in 1995 (same year as Emil Unanue), Japan Prize in 1999. Great story of him being investigated as a security risk in his autobiography. His brother was Don Strominger who ran the Cystic Fibrosis Center at St. Louis Children's Hospital for many years. Dave Dietzler (see LGM Division) did a fellowship with him in the pharmacology department at WUSM. He was awarded an honorary Doctor of Science from Washington University in 1988.

References:

Jack L. Strominger, The Tortuous Journey of a Biochemist to Immunoland and What He Found There. Annual Review of Immunology 2006; 24: 1-31:
<https://www.annualreviews.org/doi/abs/10.1146/annurev.immunol.24.021605.090703>

This is fun reading.

Table 10G

Donald Cecil Shreffler (1933-1994)

1954	University of Illinois
1953-1957	Military
1962	Ph.D., Cal Tech (Ray Owens)
1962-1975	Faculty, University of Michigan
1975-1994	Faculty, WUSM
1975-1984	Chair, Genetics WUSM
1980	Institute of Medicine
1982	National Academy of Science



Notes:

Was President of AAI – 1987-1988. Studied structure and function of the major histocompatibility complex (MHI).

References:

The American Association of Immunologists: Donald C. Shreffler, PhD, Brief Bio:

<https://www.aai.org/About/History/Past-Presidents-and-Officers/DonaldCShreffler#:~:text=Donald%20Cecil%20Shreffler%20%281933%E2%80%931994%29%20was%20the%20seventy-first%20president,and%20function%20of%20the%20major%20histocompatibility%20complex%20%28MHC%29.>

Chella David, Immunogenetics (1995) 41: 175-177. In Memoriam: A brief journey into the life of Donald Shreffler: <https://link-springer-com.beckerproxy.wustl.edu/article/10.1007/BF00172062>

Table 10H

John P. Atkinson, M.D.

1965	A.B., University of Kansas
1969	M.D., University of Kansas
1969-1971	Resident, Massachusetts General
1971-1974	Postdoc, National Institute of Health
1974-1976	Fellow (Charlie Parker), WUSM
1976-	Faculty, WUSM
1976-1992; 2007-2017	Director, Division of Rheumatology, WUSM
1992-1997	Chair, Medicine, WUSM
1996	Elected Institute of Medicine
2011	AAI: Steinman Award for Human Immunology Research, AAI
2018	Gold Medal of the American College of Rheumatology



Notes:

Attended Kansas on a basketball scholarship. Studies function and genetics of complement receptors regulation.

References:

Carol Patton, Rheumatologist John P. Atkinson, MD, Continues Research into Rare Diseases. The Rheumatologist: <https://www.the-rheumatologist.org/article/rheumatologist-john-p-atkinson-md-continues-research-into-rare-diseases/>

Washington University Institute of Clinical and Translational Sciences: <https://icts.wustl.edu/people/john-p-atkinson-md/>

Washington University. The Division of Biology & Biomedical Sciences: http://dbbs.wustl.edu/faculty/Pages/faculty_bio.aspx?SID=1302

Table 10I

Joseph Myrten Davie (1939-2022)

1966	A.B., M.A., Ph.D.-Indiana University
1968	M.D.-Washington University
1969-1971	Fellow, NIH (Bill Paul)
1972-1987	Faculty, WUSM
1975-1987	Chair, Department of Microbiology and Immunology
1987-1993	President, Research and Development – G.D. Searle
1987	Elected National Academy of Medicine
1993-2000	Senior Vice President of Research, Biogen
2001-	Director, Targeted Genetics, COVID, Inc., CV Therapeutics



Notes:

Key person in starting research arrangements with Monsanto and Mallinckrodt (see Division of Laboratory Medicine). Davie was appointed to the National Advisory Council of the Allergy and Infectious Disease by Anthony Fauci in 1987. Fauci was its Director starting in 1984.

References:

YouTube, Dr. Joe Davie, Myelin Repair Foundation:
<https://www.google.com/search?client=firefox-b-1-d&q=dr+joe+davie%2C+myelin+repair+foundation+you+tube>

Obituary: <https://www.dignitymemorial.com/obituaries/fort-myers-fl/joseph-davie-10601408>

Table 10J

Wayne M. Yokoyama, MD

1974	B.A., University of Rochester
1978	M.D., University of Hawaii
1979-1985	Resident and Fellow, University of Iowa
xxxx	Research Fellow, NIH University of California, San Francisco Mt. Sinai
1995-	Faculty, WUSM
1995-2007	Head of Rheumatology Division, WUSM
2007-	Director, MSTP Program, WUSM
2017-2018	President, American Association of Immunologists
2007	Elected member to National Academy Sciences
2009	American Academy of Arts and Science
2012	Elected member National Academy Medicine
2020	Distinguished Fellow, AAI



References:

The American Association of Immunologists: Wayne M. Yokoyama, M.D., Brief Bio:

<https://www.aai.org/About/History/Past-Presidents-and-Officers/Wayne-M-Yokoyama,-M-D>

Washington University School of Medicine, Distinguished Faculty Awards, 2016:

<https://medicine.wustl.edu/news/about/faculty-recognition/distinguished-faculty-awards/dfa-2016/wayne-m-yokoyama-md/>

Table 11

Chiefs of Immunobiology Division, Pathology

1991-1994	Co-Chief, Emil Unanue (see Chairs of Department, Table 71) (then called Division of Experimental Pathology and Immunology) Co-Chief, Bob Schreiber
1995-1999	Emil Unanue (Called the Center for Immunology)
2000-2001	Robert Schreiber
2002-2015	Andrey Shaw (renamed the Division of Immunobiology in 2008)
2017-2018	Gwendalyn Randolph
2019	Paul Allen (Interim)
2020-	Robert Schreiber (Interim)

Table 11A

Robert D. Schreiber, Ph.D. (1946-)

1968	B.A., State University of New York, Buffalo
1973	Ph.D., State University of New York, Buffalo
1973-1976	Fellow, Scripps Clinic
1976-1985	Immunology Faculty, Scripps Clinic
1979-1980	Visiting Professor, Harvard
1985-	Faculty, WUSM
1990-2017	Alumni Endowed Professor, WUSM
1991-1994	Co-Chief, Division of Experimental Pathology and Immunology
2000-2001	Chief, Center for Immunology
2012	Elected National Academy of Sciences
2017-	Andrew M. and Jane M. Bursky Distinguished Professor, Pathology & Immunology
2017	Balzan Prize
2020	Interim Chief, Immunobiology



Notes:

Member of a number of academic and company advisory boards. Recipient of many awards and named lectureships, including Distinguished Fellow of AAI in 2019.

Reference:

Department C.V.

Wikipedia: https://en.wikipedia.org/wiki/Robert_D._Schreiber

Cancer Research Institute: <https://www.cancerresearch.org/en-us/about-cri/scientific-leadership/associate-directors/robert-d-schreiber>

Table 11B

Andrey S. Shaw, M.D.

1979 B.A., Columbia
1984 M.D., Columbia
1985-1992 Resident, AP; Fellow, Yale University
1991-2014 Faculty, WUSM
2002-2014 Chief, Immunobiology Division, WUSM
2015-present Senior Fellow, Immunology-Oncology, Genentech



Notes:

On a personal level, Andrey was a neighbor who walked past my house in the evening and would often bring my dog, Sophie, back to the house when she dashed past her electronic fence. He did not have dogs but enjoyed them. He stopped walking past the house when he realized he always gave her a treat, which is why she dashed through the electronic fence in the first place.

References:

Andrey S. Shaw, Genentech Biography: <https://www.gene.com/scientists/our-scientists/andrey-shaw>

Andrey S. Shaw, M.D. Distinguished Investigator Award: <https://medicine.wustl.edu/news/about/faculty-recognition/distinguished-faculty-awards/2012-2/andrey-s-shaw-md/>

Table 11C

Gwendalyn Jan Randolph, Ph.D.

1991	B.S., Temple
1995	Ph.D., University of New York, Stonybrook
1995-1996	Postdoc, Rockefeller
1997-1998	Postdoc, Cornell (Ralph Steinman)
1998-2000	Faculty, Cornell
2000-2011	Faculty, Mt. Sinai
2011-	Faculty, WUSM
2015-2017	Chief, Division of Immunobiology, WUSM
2016-	Emil R. Unanue Distinguished Professor



Notes:

Recipient of a number of awards, honors and named lectureships. She is on the editorial boards of a number of journals including the Journal of Clinical Investigation and The Journal of Immunology

References:

Department C.V.

Wikipedia: https://en.wikipedia.org/wiki/Gwendalyn_J._Randolph

Washington People: Gwen Randolph: <https://medicine.wustl.edu/news/washington-people-gwen-randolph/>

Table 11D

Paul Malone Allen, Ph.D.

1974	B.S., University of Michigan
1977	M.S., University of Michigan
1981	Ph.D., University of Michigan
1981-1985	Research Fellow, Harvard
1985-	Faculty, WUSM
1995-	Robert L. Kroc Professor of Pathology, WUSM
2005-2006	President, AAI
2018-2019	Acting Chief, Division of Immunobiology, WUSM



Notes:

Associate Editor, Section Editor of Journal of Immunology 1987-1993. Editor of Immunity 1997-2000. President American Association of Immunologists 2005-2006, Distinguished Fellow in 2019. Deputy Editor, Journal of Immunology 2008-2013.

References:

Department C.V.

AAI Oral History Transcript: <https://www.aai.org/About/History/Past-Presidents-and-Officers/PaulMAllen>

Division of Laboratory and Genomic Medicine (LGM)

LGM became a division of the Department of Pathology in 1969 (then called the Division of Laboratory Medicine). However laboratory medicine has had a long history at Washington University.

Amongst the department Chairs after the reorganization of the medical department in 1910, two had documented experience in laboratory medicine. Philip Shaffer, PhD in biological chemistry had been an instructor in chemical pathology at Cornell 1904-1910. George Dock, M.D., in Medicine was the first professor of pathology at the Texas Medical College in Galveston, Texas (1889 to 1891) and promoted the use of blood films for diagnosis, particularly for malaria.

Ellen B. Koch. Reflections: Historical Perspectives on Pathology in Houston and Galveston. 1998. Texas Medical History E-Books. Book 7, Introduction, p.1; Education, p.1.:
<http://digitalcommons.library.tmc.edu/ebooks/7/>

Suzanne E. Fallot, Obituary George Dock, M.D.:
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC195158/>

George Dock; Michigan History:
http://umhistory.dc.umich.edu/history/faculty_history/d/dock_george.html

Dock wrote an interesting history of 19th century laboratory medicine: (George Dock. Clinical Pathology in the Eighties and Nineties. American J Clin Pathol 1946: 16: 671-680:
<https://academic-oup-com.beckerproxy.wustl.edu/ajcp/article/16/11/671/1766428>)

Teaching of Laboratory Medicine – Pre-Division

Aspects of laboratory medicine were taught to medical students at WUSM even before the reorganization of the medical school in 1910. The course Clinical Chemistry and Microscopy was part of the co-joint medicine curriculum centered in the department of Medicine. This was a laboratory course in methods of microscopic bacteriology and clinical diagnosis. It was later augmented and replaced by “Laboratory Diagnosis” and “Laboratory Methods of Diagnosis.” The latter supported small “clinical” laboratories on patient floors used by house staff or medical students to perform selected tests for their patients. These laboratories were eliminated in the 1970’s and 1980’s with the evolution of rapid transport (tubes) for delivery of samples to the central laboratories and point-of-care analytical devices with clinical laboratory monitoring.

Additional early courses related to laboratory medicine included “Infection and Immunity,” and the “study of serum reactions” (mainly serology for syphilis) and medical zoology (parasitology) were offered by the reorganized department of pathology and bacteriology. Starting in 1928, Infection and Immunity was taught by the new department of Bacteriology and Immunology headed by Jacques Jacob Bronfenbrenner, PhD (Table 10A).

There were a number of notable Medicine department faculty associated with the teaching of these courses but for the most part, they were assumed and evolved by LGM faculty after the creation of the Laboratory Medicine division in 1969.

Practitioners of Laboratory Medicine, Pre-Division

There were also notable faculty who made significant contributions to the nascent field of laboratory medicine before the formation of the division.

The first of the notable practitioners of laboratory medicine at Washington University was probably Michael Somogyi, PhD (Table 12A) at Jewish Hospital of St. Louis which then had a loose association with Washington University and the Department of Pathology until the creation of the Washington University Medical Center in 1962 (discussed later).

When Jewish Hospital moved near Barnes Hospital and the medical school in 1926, their BOD had decided to expand its clinical and research laboratories and hired Somogyi as a full-time chemist, it would be only the second hospital in the country to employ a full-time chemist. At that time the laboratory had a part-time pathologist, two technicians in microbiology, one in pathology, and one in chemistry. Somogyi emigrated to the U.S. in 1921-1922 by invitation of Phil Shaffer, Ph.D., first Chair of the Biochemistry department at WUSM. Somogyi had worked with Shaffer at Cornell in 1906-7. Somogyi together with Shaffer and Edward Adelbert Doisy (later founding Chair of Biochemistry at SLU Medical School and Nobel Laureate in 1943), prepared and purified insulin suitable for treatment of diabetes. The first child diabetic in the United States to be treated with insulin received Somogyi's preparation in October 1922 at St. Louis Children's Hospital. Somogyi developed about 12 tests of which sugar (glucose) and non-protein nitrogen (BUN) were the most commonly performed. Somogyi was also a founding member of the Advisory Board for the journal, CLINICAL CHEMISTRY. He stayed at Jewish Hospital from 1926 until his retirement in 1953. Besides purifying sufficient insulin for clinical use, he developed improved "sugar" analytical procedures and reported that excessive insulin can cause difficulty in treating diabetes, now known as the Somogyi effect. Somogyi also worked with Samuel Gray, M.D., then pathologist at Jewish Hospital to create a pancreatitis research unit and developed a widely utilized test for amylase in blood in 1933. When Somogyi retired in 1953 from the clinical chemistry laboratory, he was followed at Jewish Hospital by Sam Frankel, PhD until Oct. 1967.

Frankel was then followed by Gerry Kessler, Ph.D., who was head of clinical chemistry until the merger of Barnes and Jewish Hospitals in 1996. The formal affiliation, as I recall, was announced without a hint of it beforehand. About a year or so before the merger, a volunteer effort to look at merging the clinical laboratories of the two hospitals had been explored with consultants, administrators, and Steve Teitelbaum and Jack Ladenson from the department of Pathology. While the voluntary effort was abandoned, the discussions and planning that had occurred made the merger of the clinical laboratories relatively easy and smooth when it actually occurred.

One of the members of the pancreatitis research group at Jewish Hospital with Somogyi was Jacob G. Probst, M.D. (1894-1993) (<https://snaccooperative.org/ark:/99166/w6qv4wr3> ; https://www.stljewishlight.com/features/from-bob-plager-to-redd-fox-jewish-hospital-remembered/article_a01b8e84-7799-11e7-b368-57d0f5998110.html) who was also a member of the Surgery department at WUSM for many years. He was a physician to celebrities and added to his folklore by being the last team doctor of the St. Louis Browns (baseball), which later became the Baltimore Orioles; and the first team physician for the St. Louis Blues (hockey).

Carl Vernon Moore, M.D. (1908-1972) (Table 12B) made seminal contributions to knowledge and methods for diagnosing iron deficiency anemia, founded the hematology division in the Department of Medicine in 1938, and chaired the department of Medicine from 1955 until his death in 1972. Moore, along with Paul Lacy, were instrumental in creating the Division of Laboratory Medicine, a division of both the Pathology and Medicine departments. When I first interviewed for a position at WUSM, I interviewed with Carl Moore but he died before I started working here.

Carl Ferdinand Cori, M.D., (1896-1984) Chair of Pharmacology and later Biochemistry at WUSM, (Nobel Prize – 1947), came to the United States as Chief of Biochemistry at Buffalo General Hospital doing the routine laboratory work for patients (Carl F. Cori Oral History Transcript, 1982: <http://beckerexhibits.wustl.edu/oral/interviews/cori.html>). He also played handball with Joseph Erlanger, Chair of Physiology, a tradition that Jay McDonald and Jack

Ladenson did not know about when the Tuesday night handball “club” started. The handball club also included Curt Parvin from Lab Med, Dave Sharp in Surgery, Greg Storch in Pediatrics, Gerry Medoff and Lee Ratner in Medicine, and ex-CP resident Greg King at Christian Hospitals, amongst others.

Oliver H. Lowry, Ph.D. (1910-1996) (Oliver H Lowry, How to Succeed in Research Without Being a Genius. *Annu Rev Biochem* 1990; 59: 1-27: <https://www.annualreviews.org/doi/10.1146/annurev.bi.59.070190.000245>), Chair of Pharmacology from 1947 to 1979, was also Head of the Clinical Laboratory at the VA Jefferson Barracks Hospital from 1946 to 1953. He later influenced Dan Broida at Sigma Chemical Co. to prepare and sell biochemicals useful for detecting enzyme activity and enzymatic co-factors such as ATP (Sigma Diagnostics: Pioneer of Kits for Clinical Chemistry. *Clin Chem* 1993; 39(5): 902-903: <https://academic.oup.com/clinchem/article-abstract/39/5/902/5646878?redirectedFrom=fulltext>). This advent of chemicals and kits for enzyme analysis and work elsewhere by Saul R. Gilford (Sam Meites. Saul R. Gilford (1919-1979), A Biographical Sketch. *Clin Chem*: 1981; 630-631: <https://academic.oup.com/clinchem/article-abstract/27/4/630/5666537?redirectedFrom=fulltext>) to develop and market a simple analyzer with a built-in temperature controlled cuvette (the Gilford 300N), greatly expanded the use of measurement of enzymes in blood for clinical evaluations.

Virginia Minnich, B.S. came to Washington University in 1938 (Table 12C). She had worked with Carl Vernon Moore, M.D. at Ohio State measuring iron in fruits and then in serum. Amongst her other duties, she helped him to supervise a course in clinical laboratory diagnostic methods to the sophomore medical students and helped with research into iron metabolism. She was a very popular teacher of clinical hematology to medical students and trainees in hematology and laboratory medicine (CP). She received an honorary Doctor of Science in 1967 which lead to her becoming a research associate professor and finally getting an appropriate salary (Virginia

Minnich Oral History Transcript 1981:

<https://beckerexhibits.wustl.edu/oral/interviews/minnich.html>).

In clinical microbiology, Alexander C. Sonnenwirth, PhD (1923-1984) (Table 12D) came to St. Louis in 1953 as associate bacteriologist at Jewish Hospital and obtained his PhD at Washington University in 1960. He was appointed director of the Department of Bacteriology and Serology at Jewish Hospital in 1955. He extensively studied anaerobic bacteria and their identification. He became a member of the Laboratory Medicine division shortly after it formed. Sonnenwirth worked with McDonnell-Douglas on an automated microbiology identification system that evolved as the AMS Vitek System which was acquired by Biomerieux in 1988 and co-edited with Leonard Jarett, Gradwohl's Clinical Laboratory Methods and Diagnosis, 8th Edition.

Before Sonnenwirth came to clinical microbiology, Moyer Fleisher, MD (1875-1965) Jewish Hospital of St. Louis, 216 14(4) April 1965, page 6: <https://beckerarchives.wustl.edu/RG025-S09-ss03-B61-F12-i05> was bacteriologist at Jewish Hospital from 1919 to 1954. Fleisher came to St. Louis in 1910 and worked with Leo Loeb (Table 7B) at the Barnard Free Skin and Cancer Hospital. Fleisher was also bacteriologist at St. Louis University Medical School until he was fired in 1937 for inviting a defrocked priest and loyalist in the Spanish Civil War to give a talk: N.Y. Times, Jan 28, 1939, Section books p. 19: <https://www.nytimes.com/1939/01/28/archives/archbishop-backs-fleisher-ousting-upholds-dismissal-of-st-louis.html> .

Hugh Chaplin, MD, Jr. (1923-2016) (Table 12E) at various times held primary appointments in the Department of Medicine, the Department of Preventative Medicine, and finally the Department of Pathology. He was a hematologist as well as advisor and eventual director of the Barnes Hospital blood bank. An all-around good citizen.

Additional individuals having a role in the clinical laboratories have been identified periodically in the medical school bulletins. These include:

- Ethyl Ronzoni Bishop, PhD (1890-1973) (Table 12F) was on the Biochemistry faculty from 1923 to 1951 and had involvement with the Barnes and Children's Hospitals laboratories.
- Ann MacGregor Perley (Table 12G) was an assistant chemist in metabolism from 1931 to 1951. During WWII, she went to Los Alamos with Louis Henry Hemplemann, Jr., M.D. as part of his medical team. She was at the Trinity atomic bomb test monitoring personnel safety.
- Hiromu Tsuchiya (Table 12H) was a parasitologist who came to Washington University with Jacob Bronfenbrenner. He taught parasitology for many years as well as provided support to Barnes Hospital. A remarkable individual who stayed in St. Louis throughout WWII which was a difficult time for him. When he died, he willed everything to WUSM and Johns Hopkins School of Public Health.
- Morris Moore, PhD (Table 12I) was an early mycologist based in The Barnard Free Skin and Cancer Hospital, (Dermatology at Washington University History, The Tradition, Page 1: <https://dermatology.wustl.edu/about-us/history/>) and was also involved with Barnes and Jewish Hospitals.
- Grace Catherine Mehrten, M.A., Kansas, 1929 was involved with the Barnes microbiology laboratories and WUSM teaching clinical microbiology from 1930 until at least 1943 (WUSM Bulletins) and co-author on some research papers.
- George S. Kobayashi, PhD (Table 12J) joined the faculty in 1963 and worked closely with Gerry Medoff in the Division of Infectious Diseases studying fungal infections. They had the first NIH mycology training grant. He joined the Laboratory Medicine division in 1973.

Clinical Pathology Practitioners, Pre-Division

There were some individuals identified as doing clinical pathology (Laboratory Medicine) in the Washington University School of Medicine Bulletins before the formation of the LGM Division.

Gustave Dammin, M.D. (Table 7F) directed the Central Laboratories of Barnes Hospital starting in 1945 and was identified from 1947 to 1951 as a specialist in clinical pathology. In 1948, Dammin was also an Assistant Professor in Medicine when Virgil Loeb, Jr. (Table 13) was a fellow. An intern in Medicine that year, David Seligson would go on later to be the founding Chair of the Department of Laboratory Medicine at Yale: <https://news.yale.edu/2011/03/10/memorial-dr-david-seligson>. In 1970, I visited Seligson at Yale when I was at Hartford Hospital and he recommended that I take the job offer from WUSM.

After Dammin left Washington University, Virgil Loeb, Jr., M.D. (1921-2004) (Table 13) became identified with clinical pathology from 1952 until 1969 and was the part-time director of clinical laboratories at Barnes Hospital during that time. Loeb was a hematologist and medical oncologist and was on the BOD of the American Cancer Society starting in 1979 and its National president in 1986-1987. He laid the foundation for the National Cancer Institute designation that the Siteman Cancer Center ultimately received, according to Timothy J Eberlein, M.D., its director.

Also involved in the Barnes Hospital Clinical Laboratory on a part-time basis was William Hamilton Daughaday, M.D. (1918-2013) (Table 14) in clinical chemistry, first Chief of what is now called the Division of Endocrinology, Metabolism and Lipid Research, from 1951-1994. Carl G. Harford, M.D. (1907-1992) (Table 15), was similarly involved in Clinical Microbiology. He was the first Chief of the Division of Infectious Diseases in the Department of Medicine starting in 1942. All three of these individuals (Loeb, Daughaday, and Harford) were great supporters of laboratory medicine, as was Charlie Parker (Table 10E), who consulted in clinical immunology, but all increasingly and strongly recommended that it needed more than part-time direction and that it should have an academic head.

The Division of Laboratory Medicine

The Division was formed in 1969 to provide medical direction to the clinical laboratories of Barnes Hospital. It was established as a joint division of Pathology (Paul Lacy, Table 7H) and Medicine (first Carl Moore, Table 12B, then Dave Kipnis, Table 16). As noted above, there had been some medical oversight of Barnes Hospital laboratories previously but the expansion in the volume of laboratory testing and its increasing complexity led Virgil Loeb, Jr., Bill Daughaday, Carl Harford, and Charlie Parker, who were all involved part-time with the clinical laboratories, to urge that something be done. The Division of Laboratory Medicine was created as a joint division of the departments of Pathology and Medicine as both departments were heavily involved in laboratory based diagnosis. Originally, faculty had a primary appointment in one of the departments and a secondary appointment in the other. Faculty only with PhD's had their primary appointment in Pathology and those with MD's, their primary appointment in Medicine (the first non-M.D. with a primary appointment in Medicine was Virginia Minnich in 1974 (Table 12C). It was also set up as a hospital division for direct payment of the Lab Med faculty.

The structure of having laboratory medicine as a hospital department was similar to that used by Johns Hopkins around the same time:

<http://pathology.jhu.edu/department/about/history/1964-1988.cfm>.

Leonard Jarett was chosen by Paul Lacy and Carl Moore as the first Chief of Laboratory Medicine. Jarett had been a postdoctoral research fellow with Paul Lacy. Tables 17, A-H have the backgrounds of the Chiefs of Laboratory Medicine.

By 1969, laboratory medicine (also called clinical pathology) was incorporated into the practice of pathology in many hospitals but reached medical schools without a natural home and a few different models emerged, including separate departments or renaming Pathology departments as the Department of Pathology and Laboratory Medicine. There were a few notable separate departments, e.g., Yale, and the University of Washington. The University of

Washington combined their separate departments of Pathology and Laboratory Medicine in 2020 into the Department of Laboratory Medicine and Pathology.

The LGM Division became a division solely in pathology in 1993 but the start as a joint division with Medicine was very important for its evolution and acceptance in WUSM. My personal experience bears this out. Initially, I mostly heard of clinical laboratory complaints from the Metabolism Division, then the heaviest user of non-routine clinical chemistry tests. I gave a research talk there on the measurement of ionized calcium in the early 1970's and research questions started and clinical laboratory complaints dropped. I believe these phenomena were related.

A problem with the original structure for the reimbursement of the members of the laboratory medicine division as a hospital department became evident and was rectified about 1980 when Jay McDonald became Chief. As noted, the faculty was paid by Barnes hospital but had full medical school benefits (retirement, medical, college benefits, etc.). Being a hospital department became an issue with recruiting as the hospital used annual budgets with fixed times for making adjustments. The problem this caused was that promising faculty candidates often had to be recruited well before confirmation that the hospital budget actually reflected a position. The flexibility of using a University department budget rather than a hospital budget has proved essential for the continued development of laboratory medicine. The full transfer of the division to WUSM worked out well and a contract was made with Barnes Hospital for part A Medicare reimbursement to the division for its activities related to medical direction of the hospital laboratories. Occasionally there were issues between a laboratory director (Wash U employee) and a supervisor or technologist (Barnes Hospital employees) but all in all the system allowed for consensus and a coordination of activities. The problems that did develop were primarily issues of management control and ego.

A list of all faculty that have been in the division and their activities after leaving WUSM is in Appendix 2. Some of the people noted for only one year were in transition from training to their first position.

Members of the division have long been active in professional societies involved in Laboratory Medicine.

The division has hosted three meetings in St. Louis of the Academy of Clinical Physicians and Scientists (ACLPS), the major organization for academic laboratory medicine in the U.S.; in 1980 (Leonard Jarett), in 1996, (Jack Ladenson) and in 2011 (Mitch Scott). Faculty or past trainees who were President of ACLPS include: Jay McDonald 1987, Jack Ladenson 1995, Mike Laposata 1997, Fred Apple 2003, David Bruns 2004, David Sacks 2005, Mitch Scott 2009, Eric Spitzer 2012, Robin Lorenz 2013, and Stacey Klutts 2019. Larry Sherman was president of the American Association of Blood Banks in 1982; Glen Rodey was president of the American Society for Histocompatibility and Immunogenetics in 1982; Barbara Zehnbauer was president of the Association for Molecular Pathology in 2006, Chuck Eby, president of the International Society for Laboratory Hematology 2011-2014. Presidents of the American Association for Clinical Chemistry (AACC) who were faculty or past trainees at WUSM are: Jack Ladenson 1986, Mitch Scott 2005, Ann Gronowski 2011, Dave Koch 2015, Dennis Dietzen 2018, and Shannon Haymond, 2022.

Residency in Laboratory Medicine (Clinical Pathology)

There is evidence for clinical pathology (CP) residents at WUSM as early as the 1950s. Efforts to have CP residents at Barnes Hospital reimbursed by the hospital appear to have been caught up in the rift between Edgar Monsanto Queeny, Chair of the Board of Barnes Hospital and Edward Dempsey, then Dean of WUSM and Chair of Anatomy. The major issue which started it was whether there would be full-time or part-time faculty in a new outpatient building being planned by Barnes Hospital; Dempsey was for full-time, Queeny for part-time with the hospital making the appointment. The faculty was split on the issue and two Chancellors of Washington University eventually got involved, and lots of people were talking over each other. It could be described as a town-gown disagreement on steroids: Philip Skroska; *Queeny Tower Controversy*: (<https://becker.wustl.edu/news/queeny-tower-controversy/>). Additional information and viewpoints about the rift between Queeny and Dempsey can be found in the Oral History Transcripts of William H. Danforth, 2007: <http://beckerexhibits.wustl.edu/oral/transcripts/danforth.html>; Robert J. Glaser, 1985: <http://beckerexhibits.wustl.edu/oral/interviews/glaser.html>; Ethan A.H. Shepley, 1969 Chancellor, 1953 to 1961: <http://beckerexhibits.wustl.edu/oral/interviews/shepley.html>; George S. Hecker, 1969, President from 1961 – 1970 of the Barnard Free Skin and Cancer Hospital: <http://beckerexhibits.wustl.edu/oral/interviews/hecker.html>; Samuel B. Guze, 1994: Vice Chancellor for Medical Affairs 1971 to 1989: <http://beckerexhibits.wustl.edu/oral/interviews/guze1994.html>; and Carl F. Cori, 1982: <http://beckerexhibits.wustl.edu/oral/interviews/cori.html>

It also appears that the issue of hospital payment of clinical pathology residents got in the middle of it and it has been stated that it was one of the issues that led to Stanley Hartroft (Table 7G) resigning as Pathology Chair in 1961 (Table 7G). Dean Dempsey then appointed Paul Lacy as the new Chair of Pathology in 1961. Lacy was working then in the Anatomy Department which Dempsey chaired.

In 1964-5, after a few bad years, the rift was resolved and the Washington University Medicine School and Associated Hospitals was formed (now called the Washington University Medical Center). A new position of Vice Chancellor for Medical Affairs was created and this individual would be president of the medical center. At the same time, the medical school went to a full-time Dean after Dempsey resigned, and Morris Kenton (Ken) King, MD, was appointed and served from 1964 to 1988 (Marion Hunt, Dean among Deans. Outlook Magazine, Winter 1989, pp 20-24: <https://digitalcommons.wustl.edu/cgi/viewcontent.cgi?article=1095&context=outlook>), and Beth Miller, M. Kenton King, Dean of the Medical School for Nearly 25 years, 84: <https://source.wustl.edu/2009/10/m-kenton-king-dean-of-the-medical-school-for-nearly-25-years-84/> .

Carl Moore, MD, who was highly respected by all, served for a year as the first Vice Chancellor for Medical Affairs and then William Danforth, MD, was selected in 1965. Danforth went on to become Chancellor of the University in 1971 until 1995. Danforth recruited Pindaros Roy Vagelos, MD to be Chair of the Department of Biochemistry (1966 to 1975). Roy left to join Merck as Head of Research, then President and later Chairman. After mandatory retirement from Merck in 1995, he became Chairman of the Board of Regeneron, Vagelos Wikipedia: https://en.wikipedia.org/wiki/P._Roy_Vagelos). W. Maxwell Cowan (1931-2002) was also recruited by Danforth to lead the now renamed Department of Anatomy and Neurobiology from 1968-1980. (Cowan later was Director of Developmental Neurobiology at the Salk Institute 1980-1986 and Chief Scientific Officer at Howard Hughes Medical Institute from 1986 until his retirement in 2000. Wikipedia: https://en.wikipedia.org/wiki/W._Maxwell_Cowan)

Danforth, with the urging of Vagelos and Cowan, and likely Lacy and Kipnis as well, revamped graduate programs and the Division of Biology and Biomedical Sciences (DBBS) was created in 1973 which was across both University campuses. Before this change, graduate students were assigned to departments. With the creation of DBBS, students chose the program

of interest and not the department. A similar system had been started on the medical campus by Danforth in 1969 with the creation of the MSTP program (M.D. and Ph.D.).

DBBS was recently renamed the Roy and Diana Vagelos Division of Biology and Biomedical Sciences: Outlook Magazine Winter 2021-22: <https://outlook.wustl.edu/dbbs-named-after-vageloses/>

This consortium of university departments and its evolution allowed flexibility for virtually all Ph.D. candidates and changed the allocation of resources away from that of any single department. This greatly aided recruiting, as department based graduate students were eliminated and slots and resources more readily allocated. This also helped the research component of the Laboratory Medicine residency to be University-based and not solely in the Pathology Department.

When the residency in CP was first designed it required a year of research experience. The logic of this was that the skills learned in evaluating a research problem were invaluable to a laboratory director; including purpose, resources, time-line and execution. Promising individuals without such experience elsewhere could get it during the residency. Further, the decision was made that this research year or years could be anywhere in the University (see above) although most chose faculty in either the Pathology or Medicine departments. The residency program in laboratory medicine (clinical pathology) initially reflected the joint department nature of the division and was totally separate from the one in anatomic pathology. At least two resident graduates in CP went elsewhere for their AP training; Greg King to New Mexico and Noel Weidner to Boston.

The separation of CP residency from AP ended around 1980 when McDonald became Chief of Laboratory Medicine. It then became possible for a resident to do anatomic pathology, clinical pathology or both. This aided resident recruitment, particularly for those who did not pursue an academic career, as private practice positions generally required training and board certification in both AP and CP.

The Laboratory Medicine division became a sole division of Pathology in 1996 and the name changed to the Division of Laboratory and Genomic Medicine (LGM) around 2006-2007 to reflect an expansion in activity in the analysis and the interpretation of the human genome.

The genome activity started in the Genetics department with Robert Hugh Waterston: <https://www.yourgenome.org/stories/giants-in-genomics-robert-waterston>; Oral History Transcript Cold Spring Harbor, 2016: Robert Waterston: <https://library.cshl.edu/oralhistory/speaker/robert-waterston/> and Wikipedia: https://en.wikipedia.org/wiki/Bob_Waterston; and Maynard Olson (Wikipedia: Maynard Olson: https://en.wikipedia.org/wiki/Maynard_Olson, Oral History Transcript Cold Spring Harbor 2016: Maynard Olson: <http://library.cshl.edu/oralhistory/speaker/maynard-olson/>) In his oral history, Olson notes (pp. 19-21) that he was greatly aided by a laboratory medicine resident and later faculty member, Eric Green, MD, PhD. Both Waterston and Olson later moved to the University of Washington and Eric Green is now the Director of the National Human Genome Research Institute at NIH: <https://www.genome.gov/staff/Eric-D-Green-MD-PhD>.

The addition of bioinformatics activity in the division can be traced to Jerry Cox, who founded the Biomedical Computer Lab in 1964 and the Department of Computer Science in 1974 (Oral History Transcript 2006: Jerome R. Cox, Jr.: <http://beckerexhibits.wustl.edu/oral/interviews/cox.html>) and Washington University Computer Laboratories: A Summary of Accomplishments of the Washington University Computer Laboratories from 1967 to 1983: (https://digitalcommons.wustl.edu/bcl_insthist/1/). Mark Frisse (Department of Biomedical Informatics: Mark E. Frisse, MD, MS, MBA, FACMI: <https://www.vumc.org/dbmi/person/mark-e-frisse-md-ms-mba-facmi>) was also involved while he was at WUSM.

The first clinical laboratory information system at Barnes Hospital and one of the first in a hospital was obtained in 1972 from Phil Hicks' (<https://www.gundersonfh.com/obituaries/obituary-listings?obId=647124>) company in Wisconsin, Laboratory Consulting Inc. It was supported within the division initially by faculty member John Lewis and then Curt Parvin. When the division

moved solely to WUSM from Barnes Hospital, the laboratory information system for a short time was a joint responsibility. When a new computer system was needed, it was decided to upgrade an IBM based system then used at UAB in Birmingham, Alabama and the primary operational responsibility went to the hospital computer people. Years later this system was replaced by a commercially supported system from Cerner which is still in use.

Fellowships in Laboratory Medicine

The fellowship programs in the division started with Clinical Chemistry in 1972, followed by Transfusion Medicine in 1976, Hematopathology (joint with Surgical Pathology) in 1997 and Clinical Microbiology in 2001.

In 1971-1972, Jarett and Ladenson had applied to NIH for a training grant in clinical chemistry. The grant got good scores but then the focus of the entire NIH training grant program was changed and no more training grants in clinical chemistry were funded. Nevertheless, a fellowship program in clinical chemistry was started in 1972 with the use of funds that Ladenson received from Nova Biomedical to support work in the use of ion-specific electrodes and a guarantee from Jarett that the division would fund any postdoctoral fellow who started the program should funds later become unavailable. Then, in 1975, Michael W. Lieberman, MD, PhD (later Chair of Pathology at Baylor: <https://scholars.houstonmethodist.org/en/persons/michael-w-lieberman>), put together an environmental pathology training grant which Ladenson and McDonald were part of for many years and helped support clinical chemistry fellows. A NIH transfusion medicine training grant to Larry Sherman in 1975 helped start a blood banking fellowship. (Barnes Bulletin, November 1975, Page 3: https://digitalcommons.wustl.edu/bjc_barnes_bulletin/120/)

The next step in the evolution of the fellowship program involves discussion of the development of the CK-MB and troponin-I assays by Jack Ladenson, David N. Dietzler, (Table 18) and their laboratory team.

Troponin and CK-MB

The history of Troponin starts with Joe Davie (see Table 10I). A little before Joe became Chair of the Microbiology and Immunology department in 1980, he was approached by a “Boston group” about a project to develop monoclonal antibodies on a broad scale. The ability to make monoclonal antibodies had been described by Kohler and Milstein in 1975 and awarded a Nobel Prize in 1984.

Two St. Louis companies, first Monsanto (now part of Bayer), which had a pharmaceutical subsidiary, G.D. Searle (now part of Pfizer), and then Mallinckrodt (later part of Tyco International), who had interest in radiographic reagents and in-vitro diagnostics; indicated they wanted to be part of such a project and they ended up funding it. This was an unusual situation and a steering committee for funding projects was created consisting of Joe Davie (Table 10I) (Chair of Microbiology and Immunology), Jay McDonald (Table 17B) (Chief of Laboratory Medicine), and Dave Kipnis (Table 16) (Chair of Medicine) to evaluate proposals and avoid funding overlaps. Project areas, e.g., enzymes, coagulation, lipoproteins were set up and one page proposals solicited. Since the proposals were so short, it was agreed that the then University inventor distribution for commercial licenses would not apply to the successful one-page applications.

Core laboratories such as the Hybridoma Center Laboratory (originally located in Microbiology with Davie and later Pathology with Kathy Sheehan) and Radioimmunoassay (Ladenson) (enzyme immunoassay was not yet mainstream) were also set up and Dietzler and Ladenson started an “enzyme” project. This project initially centered on the MB isoenzyme of creatine kinase (CK-MB). This was a dimeric enzyme with three forms; M-M, mostly found in skeletal muscle; B-B, mostly in brain; and M-B, mostly cardiac muscle. This project was chosen as CK-MB was the biomarker then in use by the clinical chemistry laboratory to detect heart damage (acute myocardial infarction, AMI). The assay then used in the clinical laboratory was: 1) measure total CK activity, dilute the sample as needed if CK activity was above ~200 u/L; and

then 2) run electrophoresis to separate the three isoenzymes; 3) overlay with substrate; 4) incubate for enzymatic reaction; and 5) finally detect the enzymatic product. Samples with high CK activity had to be diluted prior to electrophoresis or the isoenzymes would appear as a smear making CK-MB undiscernible. All together, the assay took up to 4 hours.

Given the lack of specific therapy, this assay was initially clinically adequate. However, drugs to dissolve blood clots which caused most cases of AMI were in advance development (FDA approved streptokinase in 1982 and TPA in 1987). There were no stents at this time. These drugs were approved for therapy up to 4 hours after symptoms of an M.I. Given that patients usually did not get to the hospital for a few hours after symptoms, the timing pressures on both clinical and laboratory services was immense and the clinical laboratory performed up to seven routine electrophoretic analyses per day on a 24-hour basis. The confusion, phone calls, and dissatisfaction was what can be imagined.

Monoclonal antibodies to CK-MB were developed in the Ladenson-Dietzler laboratory and were given names to facilitate research laboratory discussions, as the long code which depicted the details of the experiments was often difficult to readily follow, at least for Ladenson. The antibody named Conan was conformationally directed to CK-MB and was named Conan by Vonnie (Maynard) Landt, the research lab manager and a fan of the movie of that name starring Arnold Schwarzenegger before he became Governor of California. (Vaidya, et al. Clin Chem 1986; 32(4): 657-663:

<https://academic.oup.com/clinchem/article/32/4/657/5652390?searchresult=1>). Landt is now retired and making Rivers Edge wine in Oregon with her husband, Mike Landt (Appendix 2).

Conan Ab-coated beads were effective in specifically extracting CK-MB from plasma and then the bead-bound CK-MB detected by CK enzymatic activity or later by reaction with another labeled antibody reactive to the B-subunit, named Mr. Bill, by Landt for a character on the T.V. show, Saturday Night Live.

The Conan antibody was obtained after switching from Balb-C to A/J strains of mice for immunization and using an assay for screening hybridomas that allowed solution detection of CK-MB, Conan reactivity was confirmationally dependent and did not detect the altered confirmation when CK-MB was stuck directly on Eliza plates. Monsanto had the patent rights to the antibodies but ultimately decided to give the rights back to Washington University after discussions including Moshe Alafi, https://bancroft.berkeley.edu/ROHO/narrators/alafi_moshe.html of Alafi Capital who was working with Monsanto at that time. Around this time, Monsanto entered into a basic research agreement with the University that lasted for many years. Directed by Dave Kipnis, it was estimated to have amounted to 100 million dollars over the 1980s and 1990s (Table 16).

The patented two-site immunoassay for CK-MB was licensed non-exclusively, after many discussions with interested parties by Ladenson and Duke Leahy, who then was then the only person in the Office of Technology Management (OTM). Creating a company to commercialize the antibodies was seriously considered but at this time the University did not have the infrastructure to support such efforts as it does now. (Rosalind Early. How an Invention Gets Out of the Lab and Into the World. The Source: June 15, 2020, page 6: <https://source.wustl.edu/2020/06/accelerating-innovation/>)

After open discussions between the hospital and the medical school, Conan-coated beads were sold to the hospital by the Ladenson-Dietzler laboratory until the commercial immunoassays could become available. While the commercial license was non-exclusive, one of the companies Dade International in Miami led by R and D head, Susan Evans, PhD, <https://www.aacc.org/community/merit-awards/hall-of-fame/bios/l-to-s/susan-evans> made very rapid progress, reached the market first, and then entered into a long-term research contract with the Ladenson-Dietzler laboratory.

The bead-based assay for CK-MB solved the major assay time issue for the clinical laboratory. Around this time, the Cardiology division of Medicine ran into problems with their CK-MB assay. Their assay, used only for patients on the cardiac care unit, measured B-subunit CK

activity (M-B and B-B) after extraction of B-subunit containing enzymes by a particular lot of glass beads. Cardiology did not feel that B-B interference with the assay was a clinical problem for them and they used their CK-MB values to detect re-infarction in patients on the CCU and for infarct sizing for research.

However, a new lot of glass beads did not work well in their assay and open discussions lead to the cardiology division buying the same Conan coated beads from the Ladenson-Dietzler laboratory to use in their assay. The argument that “quality” required only cardiology to run the assay on CCU patients became mute and the CK-MB assay eventually moved from cardiology to the clinical laboratory. Such movement of clinical assays from specialty divisions to the Central Laboratory was an issue for a variety of assays in many medical schools and the “quality” argument was common in order to sustain status quo. Such assays generally started out solving a clinical problem before solutions suitable for the clinical laboratory were commercially available. However, often the assays so developed generally did not evolve and improve over time. Other examples at WUSM were TSH in the Metabolism division, parathyroid hormone in the Renal division, serum electrophoresis in Neurology and Cytogenetics in Pediatrics.

With the availability of a rapid assay for CK-MB, it became apparent that CK-MB values could increase without an M.I. occurring. This was ultimately identified as due to the reactivation of the B-gene in regenerating skeletal muscle from any cause, e.g., exercise, hypothyroidism, neonate, etc.

The Ladenson-Dietzler laboratory had by then validated the first two-site immunoassay for Troponin-I (Jack Ladenson, Troponin I, the Story. Clin Chem, 2010; 56(3): 482-483: <https://academic.oup.com/clinchem/article/56/3/482/5622545>) and Dade (which later merged with Behring Diagnostics and then acquired by Siemens), via exclusive license, marketed it to clinical laboratories and it became extensively used. Troponin I is still utilized today via assays with greater sensitivity, developed by various commercial companies, by increasing the signal to noise ratio of the assays generally by decreasing background and increasing the avidity of the

antibody steps. It is marketed as high sensitivity troponin by a number of companies but no longer involves Washington University. The original development of the troponin antibodies was straightforward except that Troponin I is very sticky and glassware had to be initially silanated. It was later realized that Troponin I is quite stable in the presence of Troponin C which is the form found in blood. Ladenson and Dietzler were not involved in the adoption of Troponin-I assays at Barnes Hospital. Such a hands-off arrangement is absolutely necessary when a faculty member has a financial interest in the use of an assay or procedure. Mitch Scott did an excellent job of integrating and improving the use of Troponin into hospital practice. There are numerous examples of real or perceived conflict of interest in such situations when open and transparent discussions and arrangements are not made. Some of the licensing income from CK-MB and Troponin was involved in the creation of three endowed professorships (Oree M. Carroll and Lillian B. Ladenson Professor of Clinical Chemistry, Conan Professor of Laboratory Medicine (named for the CK-MB antibody) and the Ladenson Professor of Pathology and two undergraduate scholarships (Ladenson family scholars).

In Europe, an assay for Troponin-T was developed by Hugo Katus at Heidelberg and licensed exclusively to Boehringer-Mannheim, (now Roche). Both Troponin I and Troponin T assays are still in use.

By agreement between Emil Unanue, then Chair of Pathology, and Jay McDonald, then Chief of Laboratory Medicine, the department portion of licensing fees went to a reserve fund for laboratory medicine which could be used for supporting and expanding fellowships and the like. This reserve fund was merged into a single Pathology and Immunology department reserve fund around 2007.

The LGM division originally consisted of individuals who all had a role in the medical direction of some part of the Barnes (later Barnes-Jewish) hospital clinical laboratory. As time went on, there were areas where laboratory tests were not yet routinely available and various types of investigation and knowledge was needed for such tests to be identified and validated.

Two such areas were the microbiome and analysis of the genome as a diagnostic and/or prognostic test. The change in the name of the division to the Division of Laboratory and Genomic Medicine by Skip Virgin in 2006-2007 and the arrival of Jeff Gordon to the division in 2008 accelerated such efforts. Thus, an “investigative” branch of the division evolved which was conceptually similar to the experimental pathology activities since the department was founded in 1910.

Such expansion of an investigative faculty found a home in the renamed LGM division and was later recognized by creating co-chiefs of the division. This administrative change was a natural evolution as sections of the division had progressively required greater attention. The Conan Professorship of Laboratory Medicine which was initially given to the Chief of Laboratory Medicine, then went to the Co-Chief (academic).

CONCLUSIONS

The evolution of the department of Pathology and Immunology and its divisions has paralleled similar evolution of other departments and all of WUSM. It is hoped that this history will be of value to interested individuals as to how it came about and who was involved. I can now second the thoughts of Pepper Dehner in the acknowledgements of his book chapter, Surgical Pathology at the Washington University Medical Center and Barnes Hospital, in The History of American Surgical Pathology ed. Juan Rusai 1997 (AFIP) “It is easier to read history than to write it.”

Jack H. Ladenson
May, 2021

Table 12A

Pre-Laboratory Medicine Division Practitioners

Michael Somogyi, PhD (1883-1971)

1905	ChE Technische Hochschule, Budapest
1906-1908	Assistant in Biochemistry, Cornell
1909-1921	Chemist, Municipal Laboratory, Budapest
1914	PhD, University of Budapest
1921-1926	Faculty, WUSM
1926-1953	Chemist, Jewish Hospital St. Louis



Notes:

- Came to WashU in 1921-2 by invitation of Phil Shaffer, PhD, Chair of Biochemistry who had worked with him at Cornell
- Somogyi, together with Shaffer and Edward Adelbert Doisy (founding Chair of Biochemistry Department at Louis University School of Medicine 1923, Nobel Prize in 1943), prepared and purified insulin
- First child in U.S. to be treated with insulin received their insulin preparation at St. Louis Children's Hospital in October 1922
- Somogyi moved to Jewish Hospital when it relocated in 1926. Second full-time chemist at a U.S. hospital.
- Founded a research group to study pancreatitis (amylase assay - 1933)
- He retired from the clinical chemistry laboratory in 1953, was followed by Sam Frankel, PhD until 1967, then Gerry Kessler, PhD until the merger with Barnes Hospital in 1996.
- He said, "The hardest job in my life was to feed 10,000 hungry Hungarians during the First World War on nothing."

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https://digitalcommons.wustl.edu/bjc_216/24/ page 2

Jewish Hospital 216, October 1967: https://digitalcommons.wustl.edu/bjc_216/88/ page 3

Harry Walker. Michael Somogyi, PhD (1883-1971) Clin Chem 1971: 11(1): p. 1138:
<https://academic.oup.com/clinchem/article-abstract/17/11/1138/5675907?redirectedFrom=fulltext>

Table 12B

Carl Vernon Moore, M.D. (1908-1972)

1928	A.B., Washington University
1932	M.D., WUSM
1932-1933	Intern, Medicine and Pathology, WUSM
1934-1938	Fellow, Hematology, Ohio State
1938-1972	Faculty, WUSM
1948-1955	Co-Chair, Medicine, WUSM
1955-1972	Busch Professor and Chair, Medicine, WUSM
1953-1955	Dean, WUSM
1964-1965	First Vice-Chancellor for Medical Affairs, WUSM
1970	Elected National Academy of Sciences



Notes:

Winner of a number of awards. He made seminal contributions to knowledge and diagnosis of iron-deficient anemia. He was the founding head of the Hematology Division in Medicine in 1938. A key individual with Paul Lacy in the creation of the Division of Laboratory Medicine.

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2003 Outlook Magazine, Summer 2003: pp. 16-17
<https://digitalcommons.wustl.edu/cgi/viewcontent.cgi?article=1150&context=outlook>

Oliver H. Lowry. Carl Vernon Moore; Biographical Memoirs: V.64 (1994). The National Academies Press: <https://www.nap.edu/read/4547/chapter/13>

Table 12C

Virginia Minnich (1910-1996)

1937	B.S. – Ohio State University
1938	M.S. – Iowa State College
1939-1984	Faculty, WUSM
1972	Honorary Doctor of Science, William Woods College
1974	Named Professor of Medicine (first non-M.D.)
1996	The Virginia Minnich Memorial Visiting Professorship in Hematology was created



Notes:

- Came with Carl Vernon Moore, MD, founder of hematology division and Chair of Medicine when Laboratory Medicine division started
- A legendary morphologist who taught hematology to medical students, residents and fellows for 40+ years
- Helped set up hematology laboratories in Cuba (1945), Thailand (1951, 1954) and Turkey (1964). Pediatric Hematology laboratory then later re-named The Virginia Minnich Hematology Laboratory. While in Thailand, she described hemoglobin E as a cause of thalassemia there.

References:

Women in Medicine at WUSM, Virginia Minnich – We've Come a Long Way, Maybe:

<http://beckerexhibits.wustl.edu/women/minnich.htm>

Transcript of Oral History 1981, WUSM: <http://beckerexhibits.wustl.edu/mig/bios/minnich.html>

Wikipedia: Virginia Minnich: https://en.wikipedia.org/wiki/Virginia_Minnich

Table 12D

Alexander C. Sonnenwirth, PhD (1923-1984)

1950	B.S., Nebraska
1953	M.S., Purdue
1960	Ph.D., WUSM
1955-1984	Director, Division of Bacteriology, Jewish Hospital; Faculty, WUSM



Notes:

Studied gram negative anaerobes. Holocaust survivor. Edited Grahwohl's Clinical Laboratory Methods and Diagnosis, 6th, 7th, 8th editions: 1963, 1970, 1980. Worked with McDonald Douglas to evaluate their Auto Microbic system originally developed for NASA which evolved as the AMS Vitek System which was later acquired by Biomerieux.

References:

Andrew B. Onderdonk, Biographical feature: Alexander C. Sonnenwirth, Ph.D., J. Clin Micro 2016: 54(5); 1183-1185: <https://jcm.asm.org/content/54/5/1183>

Becker Library Collection FC052-Alexander C. Sonnenwirth Papers:
<https://beckerarchives.wustl.edu/FC052>

Jewish Hospital Bulletin, March 1955, p. 3:
https://digitalcommons.wustl.edu/cgi/viewcontent.cgi?article=1023&context=bjc_216 page 3

Table 12E

Hugh Chaplin, Jr., M.D. (1923-2016)

1943	A.B, Princeton
1947	M.D., Columbia
1948-?	Resident, Medicine, MGH
Xxxx	Fellow, NIH
Xxxx	Fellow, MRC, Blood Transfusion. Marie Cutbush Crookston – Immunohematology
Xxxx	Fellow, MRC London Immunohematology (Marie Cutbush, Sir John Dacie
Xxxx	Fellow, Blood Transfusion NIH (Nevin Hughes-Jones, Rodney Robert Porter (Nobel Prize, 1972)
1955-1991	Faculty, WUSM



Notes:

An immunohematologist who did much work in sickle cell disease and transfusion medicine including successful treatment of Polycythemia vera with radioactive phosphorus. Later joined the Laboratory Medicine division as Director of the Blood Bank. A firm supporter of the division in its formative years. He also was Director of Student Health, the Irene Johnson Institute of Rehabilitation and Associate Dean at various times during his career at WUSM. Ladenson shared laboratory space with him for a few years while the Peters Building was constructed. He also developed a Coombs test for rhinoceros at the St. Louis Zoo when Eric Miller was the research veterinarian as domestic rhinos often die of hemolytic anemia well before those in the wild. He was one of the special ones.

References:

Campus Authors: Hugh Chaplin *Lenabell*: <https://source.wustl.edu/2004/02/campus-authors-hugh-chaplin/>

Obituary – Princeton: <https://paw.princeton.edu/memorial/hugh-chaplin-jr-44> (great early picture)

Philip Skroska 2018. Advancing Sickle Cell Treatment in the Mid-20th Century: <https://becker.wustl.edu/news/advancing-sickle-cell-treatment-mid-20th-century/>

OUTLOOK Magazine, WUSM, Autumn 2016 page 38
<https://digitalcommons.wustl.edu/cgi/viewcontent.cgi?article=1199&context=outlook>

Hugh Chaplin Obituary (2016) – New York Times: <https://www.legacy.com/obituaries/nytimes/obituary.aspx?pid=179919759>

Table 12F

Ethel Ronzoni Bishop (1890-1975)

1913	B.S., Mills College
1914	A.M., Columbia
1922	Ph.D., University of Wisconsin
1923-1959	Faculty, Biochemistry, WUSM



Notes:

From 1923-1943 involved in the Barnes Hospital clinical chemistry laboratories.

References:

Women in Medicine at WUSM: Ethel Ronzoni: <http://beckerexhibits.wustl.edu/women/ronzoni.htm>

Wikipedia: Ethel Ronzoni Bishop: https://en.wikipedia.org/wiki/Ethel_Ronzoni_Bishop

Table 12G

Anne MacGregor Perley

1927	A.B. – Grinnell College
1929	M.A. – University of Nebraska
1931-1951	Faculty, Biochemistry and “assistant chemist” Children’s Hospital laboratory in metabolic monitoring
1951-?	University of Oregon



Notes:

WWII – went to Los Alamos with Louis Henry Hempelmann, Jr., M.D., (1914-1993), who became health group director Los Alamos (N.Y. Times, Obituary, July 1, 1993: <https://www.nytimes.com/1993/07/01/obituaries/lh-hempelmann-79-led-los-alamos-study.html>) (Louis H. Hempelmann, Atomic Heritage Foundation: <https://www.atomicheritage.org/profile/louis-h-hempelmann>)

Perley was at the Trinity atomic bomb test obtaining samples relative to employee health. In 1951, moved to Biochemistry Department at the University of Oregon Medical School and was still listed in their 1969 catalog.

References:

Anne M. Perley, Atomic Heritage Foundation: <https://www.atomicheritage.org/profile/anne-m-perley>

Table 12H

Hiromu Tsuchiya (1887-1971)

1913	B.S., University of Missouri
1930	Sc.D., Johns Hopkins, Protozoology
1930-1952	Fellow, Faculty, WUSM; Parasitologist
1953-1965	at Barnes Hospital



Notes:

Came to WUSM to work with Bronfenbrenner (see Table 10A). Retired in 1952 but then returned. Had difficult time during WWII but students insisted he return to classes. When he died, his principal beneficiaries were WUSM (Hiromu Tsuchiya Scholarship Fund) and Johns Hopkins Public Health (The Hiromu Tsuchiya Consolidated Scholarship Fund).

References:

Paul G. Anderson. Hiromu Tsuchiya (1887-1971) Medical Journeys. Becker Exhibits:
<http://beckerexhibits.wustl.edu/mig/bios/tsuchiya.html>

Barnes Hospital Bulletin March 1972, page 3:

https://digitalcommons.wustl.edu/do/search/?q=hiromu%20tsuchiya&start=0&context=7257040&facet=publication_year%3A1972#

Table 12I

Mycology

Morris Moore (1908 – 1980)

Photo Not Available

1928	B.S., Boston University
1929	A.M., Harvard
1933	PhD., WUSM
1934-1975	Faculty, WUSM, Barnes Hospital, Jewish Hospital, and Barnard Free Skin and Cancer Hospital

Notes:

In the WUSM Bulletin, he was referenced as mycologist to the Department of Dermatology. He was a Guggenheim Fellow in 1936.

Reference:

Moore M. and L.V. Ackerman. Archives of Dermatology and Syphilology 1946. 53: 253-264:
<https://jamanetwork.com/journals/jamadermatology/article-abstract/521210>)

Dermatology at Washington University: The Tradition, page 1:
<https://dermatology.wustl.edu/about-us/history/>

Table 12J

Mycology

George S. Kobayashi (1927-2005)

1952	B.S. Food Chemistry (enology), U.C. Berkeley
1963	PhD., Tulane
1963-1999	Faculty, WUSM
1973-1999	Mycologist, Division of Laboratory Medicine, WUSM



Notes:

Spent his youth at an interment camp in Utah. Did not come to work on 7 December. He was an early recruit to the LGM division in clinical microbiology. Served in official capacity in various journals and organizations including NIH and FDA. He was an expert on Histoplasma capsulation and a winner of WUSM distinguished service and teaching awards. He was President of the Medical Mycological Society of America in 1977. He and Gerry Medoff in Infectious dx division had the first NIH training grant in Mycology.

He was a neighbor and exceptional man – J. Ladenson

Reference:

Obituary: Kobayashi, World-class mycologist; 78: <https://source.wustl.edu/2005/04/obituary-kobayashi-worldclass-mycologist-78/>

Table 13

Virgil “Bud” Loeb, Jr. (1921-2004)

1942	B.S., Swarthmore
1944	M.D, WUSM
1944-1947	Military
1947-1967	Fellow, Faculty, WUSM
1968-2004	Professor Emeritus, WUSM
1978	Elected, Institute of Medicine
1986-1987	President, American Cancer Society



Notes:

Attending physician and/or consultant in hematology/oncology at Barnes, Jewish, St. Luke's, St. John's and the V.A. President of The American Cancer Society in 1986-1987 and instrumental in laying the foundation for the NCI designation that the Siteman Cancer Center ultimately received according to Tim Eberlein, MD, its founding director. He was also a great supporter of the Division of Laboratory Medicine and watched over the clinical laboratories from 1952 until the formation of the Division in 1969.

References:

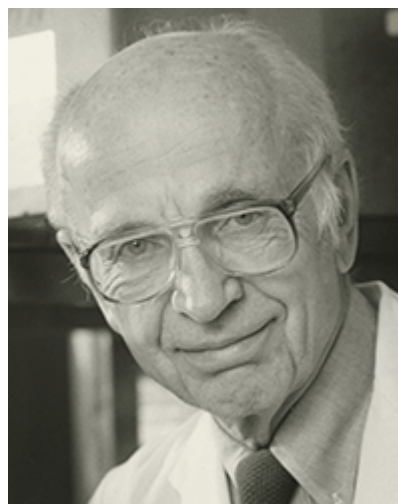
Virgil (Bud) Loeb, Jr., MD: https://hematology.wustl.edu/people/faculty/Loeb/Loeb_Obit.html

Virgil Loeb, Jr., MD. The 1986 Samuel C. Harvey Lecture: Partners in Cancer Education. J Cancer Education 1987; 2(1): 7-13: <https://pubmed.ncbi.nlm.nih.gov/3274968/>

Table 14

William Hamilton Daughaday (1918-2013)

1940	B.S., Harvard
1943	M.D., Harvard
1943-1944	Intern, Fellow, Boston City Hospital
1944-1946	Military
1947-1994	Fellow, Faculty WUSM (Carl and Gerty Cori)
1951-1994	Founding Chief, Metabolism Division in Medicine, now Division of Endocrinology, Metabolism and Lipid Research
1975	Founding Director, Diabetes Research and Training Center, WUSM
1983-1994	Irene E. and Michael M. Karl Professor of Endocrinology and Medicine
1986	Elected National Academy Sciences



Notes:

Studied the mechanism of action of growth hormone, somatomedin and insulin-like growth factors, IGF 1 and 2.

He was editor of J Lab Clin Med and J Clin Endoc Metab as well as active in other journals and the American Board of Internal Medicine. He received many awards and was the 51st President of the Endocrine Society. He was involved with part-time direction of the Barnes Hospital clinical chemistry laboratories before 1969 and a great supporter of the LGM division.

References:

The Source: Obituary: William H. Daughaday: <https://source.wustl.edu/2013/05/obituary-william-h-daughaday-former-director-of-metabolism-95/>

Daughaday WH. A failed assay opened a new door in GH research. Endocrinology. 1992; 130: 565-566: <https://academic.oup.com/endo/article-abstract/130/2/565/2535762>

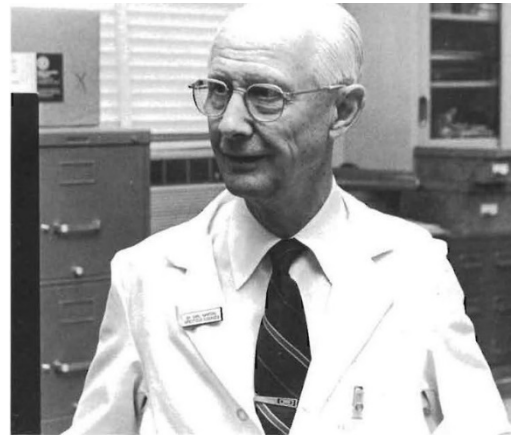
William H. Daughaday, MD, Division of Endocrinology, John T. Milliken Department of Internal Medicine: <https://endocrinology.wustl.edu/about/our-history/william-h-daughaday-md/>

Peter Rotwein. In Memoriam: William H. Daughaday, MD (1918-2013): Endocr Rev 2013; 234(6): 764-765: <https://academic.oup.com/edrv/article/34/6/764/2354653>

Table 15

Carl Gayler Harford (1907-1992)

1928	B.S., Amherst
1933	M.D., WUSM
1935-1936	Rockefeller (Peter Olitsky)
1937-1972	Faculty, WUSM
1942-1972	Founding Head of Infectious Division in Medicine Department, WUSM
1972-1992	Professor Emeritus, WUSM



Notes:

Always available for consultations vis-a-vie the clinical laboratory. Greatly encouraged and aided the Division of Laboratory Medicine in the early days.

References:

Obituary. Post-Dispatch May, 1992: <https://www.newspapers.com/clip/24773127/st-louis-post-dispatch/>

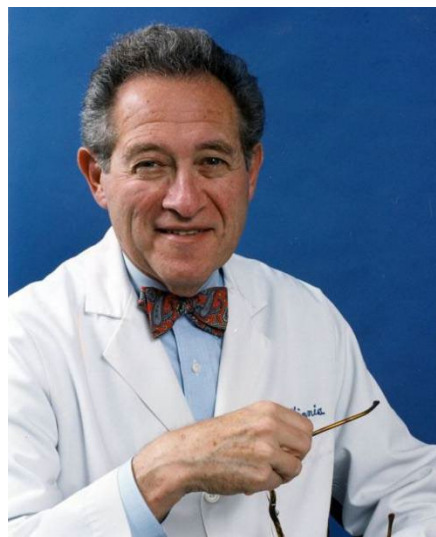
Glenda King Rosenthal. Carl Harford, M.D.: Caring, dedication, hard work. Outlook Magazine, March 1978, pages 13-16.

<https://digitalcommons.wustl.edu/cgi/viewcontent.cgi?article=1049&context=outlook> pp: 13-16

Table 16

David Morris Kipnis (1927-2014)

1948	B.S., Johns Hopkins
1950	M.D., University of Maryland
1951	Intern, Johns Hopkins
1952-1953	Resident, Duke
1954	Chief Resident, Maryland
1955-1992	Fellow (Cori's), Faculty WUSM
1973-1992	Busch Professor and Chair, Medicine, WUSM
1974	Institute of Medicine
1974	American Academy of Arts and Sciences
1981	Elected National Academy of Sciences



Notes:

Considered the best Chair of Medicine in the U.S. by Robert Glaser (Glaser Oral History Transcript). I have no reason to doubt it. A leader in the school during his time as Chair and a guiding influence on the faculty and direction of LGM. Also developed the Monsanto grant to Washington University in the 1980's and 1990's (~100 million) which lead to the development of Troponin I by Ladenson-Dietzler (see LGM section, Fellowships). Received a number of awards including the Ernst Openheimer Award from the Endocrine Society (1967), Lilly Award from the American Diabetes Association (1977) and honorary degree from Washington University as well as its 2nd Century Award (1956). The David M. and Paula L. Kipnis Distinguished Professorship was established in 2015.

References:

St. Louis Post-Dispatch, Feb 8, 2014: Dr. David Kipnis was a legendary physician at Wash U.:

https://www.stltoday.com/news/local/obituaries/dr-david-kipnis-was-a-legendary-physician-at-wash-u/article_4fb2f554-17a9-5d4d-a011-421e7fbd0459.html

The Source Obituary: <https://source.wustl.edu/2014/02/obituary-david-m-kipnis-md-distinguished-university-professor-emeritus-of-medicine-86/>

<https://endocrinology.wustl.edu/people/david-m-kipnis-md/>

Table 17

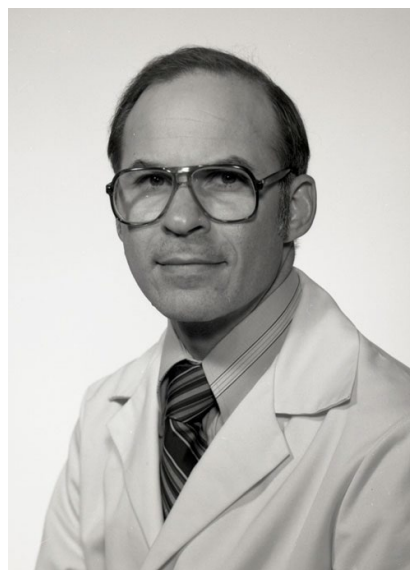
Chiefs of the Division of Laboratory and Genomic Medicine

1969-1979	Leonard Jarett, MD
1980-1990	Jay McKay McDonald, MD
1991-1999	Joseph P. Miletich, MD, PhD
1999-2003	Samuel A. Santoro, MD, PhD
2003-2008	Jack H. Ladenson, PhD (Interim)
2008-2015	Barry Paul Sleckman, MD, PhD
2016-2019	Thaddeus S. Stappenbeck, MD, PhD (Co-Chief) Chuck Eby, MD (Co-Chief)
2019-	Chuck Eby, MD (see also Chairs – Table 7K)

Table 17A

Leonard Jarett, M.D. (1936-2018)

1956	B.S., Rice Institute
1962	M.D., WUSM
1962-1964	Trainee in Pathology and Biochemistry, WUSM
1964-1966	Research Associate, NIH
1966-1979	Faculty, WUSM
1969-1979	FOUNDING CHIEF, DIVISION OF LABORATORY MEDICINE, WUSM
1980-1998	Simon Flexner Professor and Chair, Department of Pathology and Laboratory Medicine, University of Pennsylvania
1998-2003	First Leonard Jarett Professor of Pathology and Laboratory Medicine, University of Pennsylvania



Notes:

Jarett studied the mechanism of insulin action and was the longest serving Chair of Pathology in the history of the University of Pennsylvania. He received the Gold Headed Cane Award from ASIP and The David Rumbough Award of The Juvenile Diabetes Foundation, amongst other awards. He was selected by Paul Lacy and Carl Moore to start a new Division of Laboratory Medicine. Excellent choice.

References:

Barnes Hospital Bulletin: January 1969: https://digitalcommons.wustl.edu/bjc_barnes_bulletin/27/ page 1

Perelman School of Medicine: Pathology and Laboratory Medicine News, Jan 15, 2018: <http://pathology.med.upenn.edu/news/leonard-jarett-md-1936-2018-department-chair-1980-1998>

ASIP Gold-Headed Cane Award, Leonard Jarett 2000: <https://www.asip.org/membership-community/awards-honors/meritorious-awards/asip-gold-headed-cane-award/>

Obituary; Washington University School of Medicine website: <https://medicine.wustl.edu/news/obituary-leonard-jarett-former-director-laboratory-medicine-81/>

Table 17B

Jay McKay McDonald, M.D. (1943-2019)

1965	B.S., Tufts University
1969	M.D., Wayne State University
1969-1970	Medicine intern, University of Oregon
1970-1974	Resident, Wayne State University (AP/CP)
1974-1990	Fellow, Faculty, WUSM
1976-1979	Co-Director, Clinical Chemistry (with Jack Ladenson)
1980-1990	CHIEF, DIVISION OF LABORATORY MEDICINE, WUSM
1990-2010	Faculty, Emeritus Faculty, UAB
1990-2008	Chair of Pathology, UAB
1996-2010	Founding Director of Center for Metabolic Bone Disease, UAB



Notes:

Jay studied the role of calcium in hormone action. He received a number of awards including the Ward Burdick award, ASCP; Lifetime Achievement, AACC; and Gold Headed Cane, ASIP. He was on a number of editorial boards and editor in chief of the American Journal of Pathology, 2003-2008. He started the Young Investigator Awards program for ACLPS, was a consultant for the NASA space science program and gave an interesting talk on Sex in Space. He was an awkward but effective handball partner or opponent and a competent trash talker.

With his wife Sarah, he created the Jay M. McDonald Professorship in bone pathology and the Jay M. McDonald Endowed Professor Chair in laboratory medicine at UAB.

References:

<https://www.uab.edu/medicine/magazine/summer-2019/remembering-a-leader-former-pathology-chair-leaves-legacy-of-excellence-and-generosity-of-spirit>

ASIP 2011 Gold Headed Cane Award: <https://www.asip.org/membership-community/awards-honors/meritorious-awards/asip-gold-headed-cane-award/>

Gene R. Siegal, Kevin A. Roth, Robert W. Hardy; Jay McKay McDonald, M.D., 1943-2019
American J Pathol 2019; 189 (11) 2116-2118: [https://ajp.amjpathol.org/article/S0002-9440\(19\)30720-5/fulltext](https://ajp.amjpathol.org/article/S0002-9440(19)30720-5/fulltext)

Table 17C

Joseph Paul Miletich, Jr., M.D., Ph.D. (1951-)

1972	B.S., Michigan State University
1979	M.D., Ph.D., WUSM (with Phil Majerus)
1979-1982	Resident, Medicine, University of California, San Francisco
1983-1999	Faculty, Pathology and Immunology, and Medicine, WUSM
1991-1999	CHIEF, DIVISION OF LABORATORY MEDICINE, WUSM
1999-2002	Merck Research Laboratories, Senior Vice President, Discovery Research
2002-2014	Senior Vice President of Research, Amgen
2014-2021	Senior Vice President, Research and Development, Merck
2021-	Senior Scientific Advisor, Merck



Notes:

Has also been on the Board of Directors or Advisory Boards of a number of organizations, e.g., San Francisco Children's Hospital, Pharma Foundation, Flame Biosciences, Recursion.

References:

Cancer Prevention Initiative: Expert Interview with Joe Miletich, MD, PhD, on vaccines for cancer prevention: <https://www.cancerpreventioninitiative.org/expert-interview-with-joe-miletich-md-phd-senior-vice-president-of-research-sciences-at-merck-research-laboratories/>

History of clinical labs at Barnes Hospital, Timeline, 1990-2000: A new era for genomics and molecular diagnostics worldwide: <https://pathology.wustl.edu/about/history/>

Table 17D

Samuel Andrew Santoro, M.D., Ph.D. (1950-)

1972	B.S. Emory
1979	M.D., Ph.D., Vanderbilt School of Medicine
1979-2003	Resident, Faculty, WUSM
1999-2003	CONAN PROFESSOR AND CHIEF, DIVISION OF LABORATORY MEDICINE, WUSM
2003-present	Faculty, Emeritus Faculty, Vanderbilt University
2003-2018	Dorothy Beryl and Theodore R. Austin, Professor and Chair of Pathology (starting 2011, Pathology, Microbiology and Immunology) Vanderbilt
2013	Elected Fellow of the American Association for the Advancement of Science (AAAS)



Notes:

Santoro studied the molecular mechanisms of cellular adhesion to the extracellular matrix and the role of adhesion molecules in disease. He is largely responsible for the discovery and characterization of collagen receptors.


References:

Department of Pathology, Microbiology and Immunology: Vanderbilt
<https://www.vumc.org/pmi/person/samuel-santoro-md-phd-0>

VUMC Reporter: Santoro to step down as department chair of PMI:
<https://news.vumc.org/2018/09/20/santoro-step-down-chair-pmi/>

Table 17E

Jack Herman Ladenson, Ph.D. (1942-)

1964	B.S, Penn State University	
1971	Ph.D., Analytical Chemistry, University of Maryland (Bill Purdy)	
1970-1972	First Fellow in Clinical Chemistry, Hartford Hospital, Hartford, CT (George Bowers, Jr., Bob McComb, Bob Burnett)	
1972-present	Faculty, WUSM	
1993-	Oree M. Carroll and Lillian B. Ladenson Professor of Clinical Chemistry	
1995-6; 1999	ACTING CHIEF, DIVISION OF LABORATORY MEDICINE, WUSM	
2003-2008	INTERIM CHIEF, DIVISION OF LABORATORY MEDICINE, WUSM	
2003-2012	Senior Advisor to Minister of Health, Eritrea	
1996-	Board of Directors and Director of Clinical Pathology, Pathologists Overseas, Inc.	
1992-	Co-founder (with Basil Doumas) of the Athena Society	
2019	Elected National Academy of Inventors	

Notes:

Various offices and awards from AACCC, ACLPS, IFCC, Washington University and its medical alumni association. Developed the rapid immunological assays of myoglobin, CK-MB and Troponin I for heart attacks. He has visited the clinical laboratories of over 20 developing countries (low income by World Bank). Helped establish the Orotto Medical School in Eritrea and with Dave Windus, the international scholar program in internal medicine, WUSM.

References:

Department C.V.

Misia Landau, Inspiring Minds. Jack Ladenson. Clin Chem 2008; 54(3): 613-614:
<https://doi.org/10.1373/clinchem.2007.102533>

J.H. Ladenson, Citation Classic. Troponin I, The Story. Clin Chem 2010; 56(3): 482-483:
<https://academic.oup.com/clinchem/article/56/3/482/5622545>

Table 17F

Barry Paul Sleckman, M.D., Ph.D. (1960-)

1983	B.A., Lafayette College
1989	M.D., Ph.D., Harvard Medical School
1980-1993	Resident, Fellow, Brigham and Women's
1994-1998	Fellow, Faculty, Harvard (Fred Alt)
1998-2015	Faculty, Pathology and Immunology, WUSM
2008-2015	CHIEF AND CONAN PROFESSOR OF LABORATORY AND GENOMIC MEDICINE, WUSM
2015-2019	Professor and Associate Director, Meyer Cancer Center, Weil Cornell Medical School
2019-	Professor and Director, O'Neal Comprehensive Cancer Center, UAB



Notes:

Investigates the role of DNA repair in cancer. He was a New Jersey state trooper for a year after a less than sterling high school record. He is also a marathon runner and a mountain climber. He received many awards for medical student teaching while at WUSM.

References:

Department C.V.

O'Neal Comprehensive Cancer Center at UAB:

<https://www.uab.edu/onealcancercenter/about/leadership/sleckman>

Washington University School of Medicine: The Source: Michael C. Purdy, Following his instincts: Sleckman's intuition pays off in teaching, research: <https://source.wustl.edu/2010/04/following-his-instincts/>

Table 17G

Thaddeus Stappenbeck, M.D., PhD (1964-)

1987	B.A., Northwestern University
1995	M.D., Ph.D. Northwestern University
1995-2019	Resident, Fellow, (Jeff Gordon), Faculty, WUSM
2016-2019	CO-CHIEF AND CONAN PROFESSOR, DIVISION OF LABORATORY AND GENOMIC MEDICINE, WUSM
2020-	Founding Chair, Department of Inflammation and Immunity, Lerner Research Institute, Cleveland Clinic



Notes:

Elected member of a number of honorary societies. In 2016 he received the basic research award of the Crohn's and Colitis Foundation.

References:

Cleveland Clinic Lerner Research Institute: New Chair Named for Department of Inflammation & Immunity:
<https://www.lerner.ccf.org/news/details/?New+Chair+Named+for+Department+of+Inflammation+%26amp%3B+Immunity&b839a689fcefbdb6706ec822085e9f3ab9e97e7e&c038fc5fda79316e8e8ccf8fc75cb50ccf6af512>

Cleveland Clinic: Thadddus Stappenbeck, MD, PhD.:
<https://my.clevelandclinic.org/staff/25358-thaddeus-stappenbeck>

Table 17H

CHARLES (CHUCK) EBY (1955-)



1977	B.S., Duke University
1981	M.D., Vanderbilt University
1981-1987	Medicine resident and Fellow, Oncology and Hematology, University of Rochester Strong Memorial Hospital
1987-1989	Private Practice, Hematology-Oncology, Berkshire Physicians and Surgeon, Pittsfield, MA
1989-1993	Fellow, Faculty, WUSM
1993-2000	Faculty, St. Louis University
2000-present	Faculty, WUSM
2015-present	Co-Chief or Chief, Division of Laboratory and Genomic Medicine, WUSM
2018-2019	INTERIM CHAIR OF PATHOLOGY, WUSM

Notes:

A highly respected, trusted member of the faculty. A past President (2010-2014) of the International Society for Laboratory Hematology and active in a number of professional organizations. On the Editorial Board of Clinical Chemistry and International Journal of Laboratory Hematology. Received the Lifetime Achievement Award from CAP in 2014. One of the outstanding citizens of the department.

References:

Department C.V.

Department of Medicine, Division of Hematology and Oncology, Faculty Biosketch:
https://oncology.wustl.edu/people/faculty/Eby/Eby_Bio.html

Table 18

David N. Dietzler (1933-1999)

1957 A.B, Washington University
1963 PhD, WUSM
1964-1999 Fellow, Faculty WUSM (Jack Strominger)



Notes:

He was a postdoctoral fellow with Jack Strominger (Table 10F) in the Pharmacology department and then went to Pediatrics and St. Louis Children's Hospital clinical chemistry laboratory. He moved to the Laboratory Medicine division in 1980. A very key person in the development of Troponin-I, and LGM in general.

References:

Washington University Magazine and Alumni News, Summer 2000, In Remembrance, page 47:

https://digitalcommons.wustl.edu/ad_wumag/152/

Appendix 1

FLEXNER REPORT: <http://archive.carnegiefoundation.org/publications/medical-education-united-states-and-canada-bulletin-number-four-flexner-report.html>

Missouri Schools: pages 251-258

St. Louis Schools: pages 254-258

Chapter XIV, The Medical Education of the Negro, pp. 180-181

Chapter XIII. The Medical Education of Women, pp. 178-179

URL obtained from Brian Edelson, WUSM

Appendix 2 - Faculty History of the Division of Laboratory and Genomic Medicine

Last Name, Degree	First Name	1 st Year as Faculty at University	Last Year	Field	Notes
Abraham, Ph.D.	Sonam Ninan	1991	1997	Clinical Microbiology	Jewish Hospital; Now Grace Kerby Distinguished Professor of Pathology, Duke University: https://scholars.duke.edu/person/soman.abraham
Ahmed, M.B., M.S.	Parveen	1981	1988	Transfusion Medicine	Now at Whittier Hospital Medical Center
Amarasinghe, Ph.D.	Gaya	2013		Immunology	
Amarillo, Ph.D.	Ina	2014		Genomics	https://pathology.wustl.edu/office-of-faculty-development/faculty-features/
Anderson, M.D.	Neil William	2014		Clinical Microbiology	
Baorto, M.D., Ph.D.	David M.	1999	1999	Bioinformatics	Now Biomedical Informatics, Columbia University
Barratt, Ph.D.	Michael James	2012		Microbiome	https://pathology.wustl.edu/office-of-faculty-development/faculty-features/
Bell, Jr., M.D.	C. Elliott	1971	1987	Clinical Immunology	Left University in 1987 but back as an Instructor in Medicine since 2003
Blinder, M.D.	Morey A.	1990	1998	Hematology	Part –time https://oncology.wustl.edu/people/faculty/Blinder/Blinder_Bio.html
Brestoff, M.D., Ph.D., MPH	Jonathan R.	2020		Flow Cytometry	
Broze, Jr., M.D.	George John	2005	2019	Hematology/Coagulation	Part-time; died 2019 https://medicine.wustl.edu/news/obituary-george-broze-professor-of-medicine-72/
Budelier, Ph.D.	Melissa	2020		Clinical Chemistry/Toxicology	
Burack, M.D.	Richard	2003	2006	Hematopathology	Now at University of Rochester: https://www.urmc.rochester.edu/people/27092866-walter-richard-burack

Appendix 2 – Faculty History of the Division of Laboratory and Genomic Medicine, continued

Last Name, Degree	First Name	1 st Year as Faculty at University	Last Year	Field	Notes
Burnham, Ph.D.	Carey-Ann Dawn	2012		Clinical Microbiology	Now at Pattern Bioscience, Chief Clinical Officer: https://pattern.bio/pattern-bioscience-appoints-carey-ann-burnham-as-chief-clinical-officer/
Calderon, Ph.D.	Boris	2011	2014	Clinical Chemistry/Immunology	Now at Eli Lilly
Cao, Ph.D.	Yang	2017		Genomics	https://pathology.wustl.edu/office-of-faculty-development/faculty-features/
Chan, Ph.D.	Kwok-Ming	1982	1987	Clinical Chemistry	Went to UCLA; Now retired
Chaplin, Jr., M.D.	Hugh	1955	1991	Transfusion Medicine	Joined Division in 1983; died in 2006 (see Table 12E)
Coch, PhD.	Emily H.	1971	1975	Clinical Chemistry	Jewish Hospital
Dantas, Ph.D.	Gautam	2009		Microbiome	
Davis, PhD.	James E.	1973	1980	Clinical Chemistry	Went to DuPont Diagnostics; lost to follow up
Despotis, M.D.	George J.	2000		Transfusion Medicine	
Dietzen, Ph.D.	Dennis J.	2008		Clinical Chemistry	St. Louis Children's Hospital; President AACC 2018
Dietzler, Ph.D.	David N.	1965	1989	Clinical Chemistry	Was in Children's ~1965-1979, then Division; died 2019 (See Table 18)
Dunne, Jr., Ph.D.	W. Michael	2001	2010	Clinical Microbiology	Went to BioMerieux; Retired, now Adjunct Professor: https://jcm.asm.org/content/55/11/3162
Eberly, Ph.D.	Allison Rae	2021		Clinical Microbiology	
Eby, M.D.	Charles S.	1992 2000	1993	Clinical Hematology; Division Chief, Interim Chair	Was Interim Chair of Pathology, WUSM 2018-2019 (See tables 7K, 17H)

Appendix 2 – Faculty History of the Division of Laboratory and Genomic Medicine, continued

Last Name, Degree	First Name	1 st Year as Faculty at University	Last Year	Field	Notes
Edelson, M.D., Ph.D.	Brian T.	2011	2011		Now in Immunobiology Division, WUSM
Farnsworth, Ph.D.	Christopher W.	2019		Clinical Chemistry	https://pathology.wustl.edu/office-of-faculty-development/faculty-features/
Frater, M.D.	John Lawrence	2006		Hematopathology	
Gebel, Ph.D.	Howard M.	1980	1983	Clinical Immunology, HLA	Went to Rush; at Emory University since 2001
Goodnough, M.D.	Lawrence Tim	1993	2004	Transfusion Medicine	Now at Stanford
Gordon, M.D.	Jeffrey I.	1981		Microbiome	Came to LGM in 2008. Now, Dr. Robert J. Glaser distinguished University Professor. https://source.wustl.edu/2017/03/the-father-of-the-microbiome/
Graves, Ph.D., M.D.	Charles Bruce	1985	1985	Clinical Chemistry	Now internist in Wyoming
Green, M.D., Ph.D.	Eric D.	1992	1993	Molecular Dx	Went to NIH, now Director of the National Human Genome Research Institute (NHGRI)
Griffin, Ph.D.	Nicholas Wayne	2014		Microbiome	
Gronowski, Ph.D.	Ann Marie	1997		Clinical Chemistry	Clin Chem 2021; 67(4): 579-582 Inspiring Minds https://academic.oup.com/clinchem/article/67/4/579/6206717
Grossman, M.D., MPH	Brenda Jean	2009		Transfusion Medicine	https://pathology.wustl.edu/office-of-faculty-development/faculty-features/
Handley, Ph.D.	Scott A.	2012		Microbiome	https://pathology.wustl.edu/office-of-faculty-development/faculty-features/

Appendix 2 – Faculty History of the Division of Laboratory and Genomic Medicine, continued

Last Name, Degree	First Name	1 st Year as Faculty at University	Last Year	Field	Notes
Heusel, M.D., Ph.D.	Jonathan W.	2014		Genomics	
Hewitt, Ph.D.	Thomas E.	1976	1980	Clinical Chemistry	Jewish Hospital, then Medicine Department and Private Practice
Hibberd, Ph.D.	Matthew C.	2018		Microbiome	https://pathology.wustl.edu/office-of-faculty-development/faculty-features/
Hockett, M.D.	Richard D.	1991	1991	Molecular Dx	Went to UAB, then Affymetrix until 2008; then Lilly; now unknown
Hortin, M.D., Ph.D.	Glen L.	1989	1992	Clinical Chemistry	Jewish Hospital; Now at Quest Diagnostics, Florida
Jackups, Jr., M.D., Ph.D.	Ronald R.	2012		Transfusion Medicine, Hematology	
Jain, Ph.D.	Umang	2020		Microbiome	
Jarett, M.D.	Leonard	1966	1979	Founding Chief	Went to U of Penn as Chair of Pathology; Longest serving Chair there (1980 to 1998); died 2018 (Table 17A)
Joist, M.D.	Johann Heinz	1973	1978	Clinical Hematology and Coagulation	Went to SLU; created a reference coagulation lab there; died 2004 (J of Thrombosis Haemastasis 2004: 2; 1497-8): https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1538-7836.2004.00872.x
Kaplan, M.D.	Harold Seymour	1969	1971	Transfusion Medicine	
Kessler, Ph.D.	Gerry	1968	1996	Clinical Chemistry	Jewish Hospital; Now retired

Appendix 2 – Faculty History of the Division of Laboratory and Genomic Medicine, continued

Last Name, Degree	First Name	1 st Year as Faculty at University	Last Year	Field	Notes
Kobayashi, Ph.D.	George S.	1963	1999	Mycology /Clinical Microbiology	In Lab Med 1973-1999; died 2005 (Table 12J) https://source.wustl.edu/2005/04/obituary-kobayashi-worldclass-mycologist-78/
Krogstad, M.D.	Donald J.	1978	1991	Clinical Microbiology	Went to Tulane as Chair of Tropical Medicine in Public Health; died 2020: https://sph.tulane.edu/news/memorial-donald-j-krogstad-md-1943-2020
Krysiak, Ph.D.	Kilannin	2020		Genomics	
Kulkarni, Ph.D.	Shashikant	2007	2009	Cytogenetics	Now at Baylor College of Medicine
Ladenson, Ph.D.	Jack H.	1973		Clinical Chemistry, Interim Chief	Table 17E
Landt, Ph.D.	Michael L.	1981	1997	Clinical Chemistry	Children's Hospital; retired; now makes Rivers Edge wine
Lewis III, Ph.D.	John W.	1973	1979	Bioinformatics	Lost to follow-up
Liu, M.D., Ph.D.	Chang	2014		HLA	https://pathology.wustl.edu/wp-content/uploads/2020/07/Liu_feature-Final.pdf
Lockwood, Ph.D.	Christina M.	2010	2013	Molecular Dx	Went to University of Washington
Lorenz, M.D., Ph.D.	Robinna G.	1994	2001	Clinical Immunology	Went to UAB, now Executive Director, Research Management, Research Pathology at Genentech https://www.gene.com/scientists/our-scientists/robinna-lorenz

Appendix 2 – Faculty History of the Division of Laboratory and Genomic Medicine, continued

Last Name, Degree	First Name	1 st Year as Faculty at University	Last Year	Field	Notes
Love-Gregory, Ph.D.	Latisha D.	2018		Genomics	
Lowe, M.D.	John B.	1985	1986	Transfusion Medicine	Later became Chair of Pathology, Case Western; Senior Director of Pathology Genentech; retired 2018 https://medicine.utah.edu/alumni/news/2015/02/john-low-m-d-80-distinguished-alumni-u-of-u-school-of-medicine
Lublin, M.D.	Douglas M.	1988	2010	Transfusion Medicine	Retired
Luzzi, Ph.D.	Veronica Ines	2005	2007	Clinical Chemistry	Now at Providence Regional Laboratories, Washington
Marr, M.D.	J. Joseph	1974	1977	Clinical Microbiology	Went to Univ of Colorado as Director of Infectious Diseases, then Searle in discovery research, then start ups; author of a number of books including "Fall from Grace" https://digitalcommons.wustl.edu/bjc_barnes_bulletin/92/ Page 6 He wore a tie only when he was seeing patients; something Ladenson quickly adopted from him.
Mauch, Ph.D.	John C.	1975	1978	Clinical Chemistry	Went to Kodak Diagnostics; lost to follow-up
McDonald, M.D.	Jay McKay	1977	1989	Clinical Chemistry, Chief of Lab Med	Went to UAB, Chair of Pathology, Died 2019 (See Table 17B)
Milbrandt, M.D., Ph.D.	Jeffrey D.	1984			Now Chair, Department of Genetics, WUSM
Miletich, M.D., Ph.D.	Joseph P.	1983	1999	Hematology; Chief of Lab Med	Went to Merck, then Amgen, now back at Merck (See Table 17C)
Miller, M.D.	William V.	1974	1975	Transfusion Medicine	Went to Red Cross; now retired

Appendix 2 – Faculty History of the Division of Laboratory and Genomic Medicine, continued

Last Name, Degree	First Name	1 st Year as Faculty at University	Last Year	Field	Notes
Mohanakumar, Ph.D.	Thalachallour	1987	2009	HLA	Now at Norton Thoracic Institute Research Laboratory https://www.supportstjosephs.org/nortonresearch
Mosammaparast, M.D., Ph.D.	Nima	2013		Genomics	https://pathology.wustl.edu/office-of-faculty-development/faculty-features/
Moser, Ph.D.	Steve A.	1983	1990	Clinical Microbiology	Jewish Hospital; Went to UAB, retired 2018
Murray, Ph.D.	Patrick	1977	1999	Clinical Microbiology	Went to Univ of Maryland and NIH, and then Becton-Dickinson Diagnostics (J Clin Microbiology 2016: 54, 1942-1945) https://jcm.asm.org/content/54/8/1942
Nagarajan, M.D., Ph.D.	Rakesh	2004	2014	Bioinformatics	Now at Pierian Dx; Adjunct Professor https://www.pieriandx.com/team-members-rakesh-nagarajan
Nahm, M.D.	Moon	1981	1996	Clinical Chemistry	Now at UAB https://www.google.com/search?client=firefox-b-1-d&q=moon+nahm+uab+article+pdf
Neidich, M.D.	Julie Ann	2017		Genomics	
Parikh, M.D., Ph.D.	Bijal	2013		Molecular Diagnostics	
Parvin, Ph.D.	Curtis	1981	2008	Bioinformatics	Now with Bio-Rad
Payton, M.D., Ph.D.	Jacqueline E.	2010		Molecular Diagnostics	https://pathology.wustl.edu/office-of-faculty-development/faculty-features/
Persaud, M.D., Ph.D.	Stephen P.	2020		HLA, Hematology	

Appendix 2 – Faculty History of the Division of Laboratory and Genomic Medicine, continued

Last Name, Degree	First Name	1 st Year as Faculty at University	Last Year	Field	Notes
Reppun, M.D.	Thomas S.	1980	1981	Clinical Chemistry	Emeritus Partner, Hawaii Pathologists Laboratory, LLP
Riley, Ph.D.	Sarah Brown	2012	2016	Clinical Chemistry, Toxicology	Children's Hospital; Now at SLU https://www.slu.edu/medicine/pathology/faculty/riley-sarah.php
Rodey, M.D.	Glen E.	1977	1987	HLA	Went to Emory; Retired 1999 https://www.ashi-hla.org/page/ashi_history
Roper, Ph.D.	Steven Matthew	2018		Clinical Chemistry	Children's Hospital
Sahm, Ph.D.	Daniel F.	1992	1997	Clinical Microbiology	Jewish Hospital, now Chief Scientific Officer of Microbiology, IHMA Inc. https://www.ihma.com/about-us/
Santoro, M.D., Ph.D.	Samuel	1982	2003	Hemostasis, Chief	Went to Vanderbilt as Chair of Pathology until 2018, now Emeritus (Table 17D)
Schroeder, Ph.D.	Molly	2018		Genomics	https://pathology.wustl.edu/office-of-faculty-development/faculty-features/
Scott, Ph.D.	Mitchell G.	1988		Clinical Chemistry	Clinical Chemistry 2020; 66 (4): 505-508: Inspiring Minds: https://academic.oup.com/clinchem/article/66/4/505/5814100 Pathology & Immunology, Office of Faculty Development: https://pathology.wustl.edu/office-of-faculty-development/faculty-features/ Now Retired

Appendix 2 – Faculty History of the Division of Laboratory and Genomic Medicine, continued

Last Name, Degree	First Name	1 st Year as Faculty at University	Last Year	Field	Notes
Sherman, M.D., LLB	Larry	1970	1982	Transfusion Medicine; Coagulation	Jewish Hospital, Division in 1972, then Northwestern, Now Professor Emeritus: https://digitalcommons.wustl.edu/bjc_barnes_bulletin/92/ Page 6
Siegfried, M.D.	Barry Allan	1982	1984	Clinical Chemistry	Jewish Hospital; Now American Red Cross, Michigan
Silva, M.D.	Victor A.	1988	1992	Hematology	Jewish Hospital; Now in Florida
Sleckman, M.D., Ph.D.	Barry Paul	1998	2015	Clinical Immunology, Division Chief	Joined division in 2005; Chief in 2008; went to Weill Cornell, now Director of Cancer Center, UAB (Table 17F)
Smith, M.D.	Carl Hugh	1965	2007	Clinical Chemistry	Children's Hospital, now retired
Sonenwirth, Ph.D.	Alex	1953	1983	Clinical Microbiology	Jewish Hospital (Table 12D); joined Division in 1969; died 1984 (J Clin Microbiol 2015: 54(5); 1183-1185): https://jcm.asm.org/content/54/5/1183
Southern, Jr., M.D.	Paul M.	1971	1973	Clinical Microbiology	Now Professor Emeritus, UT Southwestern: https://www.utsouthwestern.edu/ctplus/stories/2020/professor-emeritus-southern.html
Stappenbeck, M.D., Ph.D.	Thaddeus S.	1998	2019	Laboratory Medicine, Co-Chief	Joined Lab Med in 2016 as division Co-Chief and Conan Professor; went to Cleveland Clinic as Chair of Department of Inflammation and Immunity (Table 17G)
Stevens, Ph.D.	Sue Cassell	1969	1979	Steroid biochemistry	Jewish Hospital, retired

Appendix 2 – Faculty History of the Division of Laboratory and Genomic Medicine, continued

Last Name, Degree	First Name	1 st Year as Faculty at University	Last Year	Field	Notes
Swamidass, M.D., Ph.D.	Sanjay Joshua	2010		Bioinformatics	
Swat, Ph.D.	Wojciech	2008	2021	Molecular Pathology	Now at GenPath
Thibodeaux, M.D., Ph.D.	Suzanne Renee	2018		Transfusion Medicine	https://pathology.wustl.edu/office-of-faculty-development/faculty-features/
Tollefsen, M.D., Ph.D.	Douglas M.	2005	2015	Clinical Hematology	Part-time https://oncology.wustl.edu/people/faculty/Tollefsen/Tollefsen_Bio.html
Tung, M.B.	Kenneth S.K.	1988	1991	HLA	Went to UVA; now Emeritus there
Turk, M.D., Ph.D.	John W.	1983	2021	Toxicology	Alan A. and Edith L. Wolf Professor of Endocrinology https://endocrinology.wustl.edu/about/our-history/john-turk-md-phd/ Died 2021
Valdes, Jr., Ph.D.	Roland	1980	1988	Clinical Chemistry	Jewish Hospital; now at Dept of Path and Lab Medicine, Univ of Louisville: https://louisville.edu/medicine/departments/pathology/faculty/valdes
Wang, Ph.D.	Dave	2004		Microbiology/Virology	
Watson, MD, Ph.D.	Mark	1996		Genomics, Tissue Procurement	
Weck, M.D.	Karen E.	1996	1998	Molecular Genetics	Now at UNC, unusual for a Duke grad https://www.med.unc.edu/pathology/directory/kweck/
Werner, M.D.	Mario	1971	1971	Clinical Chemistry	Went to George Washington Univ; died 2001

Appendix 2 – Faculty History of the Division of Laboratory and Genomic Medicine, continued

Wilner, M.D.	George D.	1979	1988	Hematology/Coagulation	Jewish Hospital; then Albany Medical Center; Died in 2021 Obit: https://outlook.wustl.edu/archive/ Outlook Magazine Winter 2021-2022 page 36
Wu, Ph.D.	Chao	2019		Virology	
Yarbrough, Ph.D.	Melanie L.	2017		Clinical Microbiology	https://pathology.wustl.edu/office-of-faculty-development/faculty-features/
Yaseen, M.D., Ph.D.	Nabeel Rasheed	2008		Hematopathology	Went to Northwestern
Zaydman, M.D, Ph.D.	Mark A.	2021		Bioinformatics	
Zhang, M.D., Ph.D.	Ray	2020		Bioinformatics	
Zhang, Ph.D.	Lijuan	2004	2009	Clinical Chemistry	Now at Ocean University of China, Shandong http://eweb.ouc.edu.cn/mp/2014/0111/c3931a19163/page.htm
Zehnbauer, Ph.D.	Barbara N.	1994	2009	Molecular Diagnostics	Went to CDC; now Adjunct Professor Emory; Editor-in-Chief, J. Molecular Diagnostics
Zutter, M.D.	Mary	1989	2004	Hematopathology	Now Louise B. McGavock Chair, Vanderbilt: https://www.vumc.org/pmi/person/mary-m-zutter-md

Appendix 3: Photo Sources

Page #	Picture	Source
19	Frank J. Dixon	The American Association of Immunologists (AAI) records, Center for Biological Sciences Archives, Collection 12, Special Collections, University of Maryland, Baltimore County (Baltimore, MD) with permission: Frank J. Dixon, MD: https://contentdm.ad.umbc.edu/digital/collection/aai/id/15
19	Emil R. Unanue	Unanue-Medical Journeys WUSM: http://beckerehibits.wustl.edu/mig/bios/unanue.html
30	Abraham Flexner	Wikipedia: https://en.wikipedia.org/wiki/Abraham_Flexner
31	Arthur Dean Bevan	University of Chicago Photographic Archive, Bevan, Arthur Dean (digital photo number apf1-00673,Hanna Holborn Gray Special Collections Research Center, University of Chicago Library. https://photoarchive.lib.uchicago.edu/db.xqy?one=apf1-00673.xml
32	Henry Smith Pritchett	Wikipedia: https://en.wikipedia.org/wiki/Henry_Smith_Pritchett
33	William Henry Welch	https://commons.wikimedia.org/wiki/File:Whwelchmd.jpg
34	Simon Flexner	https://en.wikipedia.org/wiki/Simon_Flexner
35	Robert Somers Brookings	Wikipedia: https://en.wikipedia.org/wiki/Robert_S._Brookings
38	Eugene Lindsay Opie	https://en.wikipedia.org/wiki/Eugene_Lindsay_Opie

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40	Leo Loeb	http://beckerexhibits.wustl.edu/mig/bios/loeb.html
42	Howard Anderson McCordock	WUSM Oral History; Project Image: http://beckerexhibits.wustl.edu/oral/win2/McCordockHA.html
43	Margaret Gladys Smith	Women in Health Science WUSM: http://beckerexhibits.wustl.edu/mowihsp/bios/smith.htm
45	Robert Allan Moore	Origins and History of WUSM; The Modern Era, 1930-1991: http://beckerexhibits.wustl.edu/wusm-hist/modern/index.htm
46	Gustave Dammin	WUSM Oral History Project; Image: http://beckerexhibits.wustl.edu/oral/win2/DamminGJ.html
47	Walter Stanley Hartroft	WUSM Oral History; Project Image: http://beckerexhibits.wustl.edu/oral/win2/HartroftWS.html
48	Paul Eston Lacy	Barnes Bulletin, July 198, Front Cover:: https://digitalcommons.wustl.edu/cgi/viewcontent.cgi?article=1210&context=bjc_barnes_bu
50	Emil Raphael Unanue	Outlook Magazine, Winter 1995- Digital Commons@Becker page 2: https://digitalcommons.wustl.edu/outlook/111/
51	Herbert (Skip) Virgin	https://source.wustl.edu/2016/05/murphy-virgin-elected-national-academy-sciences/
52	Chuck Eby	CAP Today January 2018: https://www.captodayonline.com/genotype-guided-dosing-warfarin-gift-wrap/ Used with permission of Bob McGonnagle at the College of American Pathologists

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53	Richard J. Cote	https://pathology.wustl.edu/people/richard-cote-md/ Used with permission of Dr. Cote, Chair of Pathology and Immunology, WUSM
61	Lauren Vedder Ackerman	Studio portrait of Lauren V. Ackerman: https://beckerarchives.wustl.edu/VC331-i331001\
62	Walter Carl Bauer	Becker Archives; Item VC265-524-B01-i03-Walter C. Bauer seated at a microscope: https://beckerarchives.wustl.edu/VC265-S24-B01-i03
63	Robert W. McDivitt	Jewish Hospital 216; Jan/Feb 1985, page 3: https://digitalcommons.wustl.edu/cgi/viewcontent.cgi?article=1173&context=bjc_216
64	Pepper Dehner	https://pathology.wustl.edu/people/louis-p-dehner-md/ Used with permission of Dr. Cote, Chair of Pathology and Immunology, WUSM
65	Peter Humphrey	Humphrey is Ladenson Professor, Outlook Magazine Fall 2008, page 6: https://digitalcommons.wustl.edu/outlook/159/
66	Steve Teitelbaum	https://pathology.wustl.edu/people/steven-teitelbaum-md/ Used with permission of Dr. Cote, Chair of Pathology and Immunology, WUSM
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68	Joe Gaut	https://pathology.wustl.edu/people/joseph-gaut-md-phd/ Used with permission of Dr. Cote, Chair of Pathology and Immunology, WUSM
72	William Osborn Russell	Steven J. Hajdu, M.D.; William O. Russell, MD. (1910-1997) Amer J Clin Path 1998: 109, 492-3: https://academic.oup.com/ajcp/article/109/4/492/1757907

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73	David English Smith, Jr.	https://beckerarchives.wustl.edu/VC410-S19-ss109-i02
74	Sarah Amanda Luse	Women in Health Sciences WUSM: http://beckerexhibits.wustl.edu/mowihsp/bios/luse.htm
75	Richard Maurice Torack	Cropped from slide of group portrait of Martin S. Silverman, Richard M. Torack and Keith Harry Fulling in a laboratory; reference code VC265-S335-B14-i15. Becker Library Archives https://beckerarchives.wustl.edu/informationobject/browse?sq0=richard+m+torack&sf0=&levels=&onlyMedia=&findingAidStatus=&objectType=inclusive
76	James Smith Nelson	Robert E. Schmidt, James Smith Nelson, M.D.; March 19, 1993-Sept. 21, 2016. J Neuropathology and Experimental Neurology 2017, 76(1); p. 67: https://academic.oup.com/jnen/article/76/1/67/2930498?login=true pdf Used with permission via The Copyright Clearance Center
77	William Frederick Hickey	Dartmouth Medicine Magazine; Winter 2000: https://dartmed.dartmouth.edu/winter00/html/vs_deanships.shtml
78	Bob Schmidt	https://pathology.wustl.edu/people/robert-schmidt-md-phd/
82	Jacques Bronfenbrenner	WUSM, Medical Journey; Jacques Jacob Bronfenbrenner (1883-1953): http://beckerexhibits.wustl.edu/mig/bios/bronfenbrenner.html
83	Robert Joy Glaser	https://beckerarchives.wustl.edu/VC410-S07-ss039-i02
84	Frank James Dixon	The American Association of Immunologists (AAI) records, Center for Biological Sciences Archives, Collection 12, Special Collections, University of Maryland, Baltimore County (Baltimore, MD) with permission: https://contentdm.ad.umbc.edu/digital/collection/aai/id/15

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85	Herman Nathaniel Eisen	<p>Past Presidents and Officers. The American Association of Immunologists. Herman N. Eisen 1968-1969: https://www.aai.org/About/History/Past-Presidents-and-Officers/HermanNEisen</p> <p>With permission from The American Association of Immunologist (AAI) records, Center for biological Sciences Archives, Collection 12, Special Collections, University of Maryland, Baltimore County (Baltimore, MD)</p>
86	Charles Ward Parker	<p>University Archives: https://source.wustl.edu/2013/04/obituary-charles-w-parker-emeritus-professor-of-medicine-83/</p>
87	Jack Leonard Strominger	<p>Jack L. Strominger, The Tortuous Journey of a Biochemist to Immunoland and What He Found There. Annual Review of Immunology 2006; 24: 1-31: https://www.annualreviews.org/doi/abs/10.1146/annurev.immunol.24.021605.090703</p> <p>With permission via The Copyright Clearance Center</p>
88	Donald Cecil Shreffler	<p>AAI Brief Biography: Donald C. Shreffler 1987-1988: https://www.aai.org/About/History/Past-Presidents-and-Officers/DonaldCShreffler#:~:text=Donald%20Cecil%20Shreffler%20%281933%E2%80%931994%29%20was%20the%20seventy-first%20president,and%20function%20of%20the%20major%20histocompatibility%20complex%20%28MHC%29</p> <p>With permission from The American Association of Immunologist (AAI) records, Center for biological Sciences Archives, Collection 12, Special Collections, University of Maryland, Baltimore County (Baltimore, MD)</p>
89	John P. Atkinson	<p>https://beckerarchives.wustl.edu/VC410-S01-ss48-i01</p>
90	Joseph Myrten Davie	<p>WUSM Bulletin 1984, Department of Microbiology and Immunology, page 57: https://digitalcommons.wustl.edu/med_bulletins/85</p>
91	Wayne Yokoyama	<p>WUSM, Samuel R. Goldstein Leadership Award in Medical Student Education, Distinguished Faculty Awards, 2016: https://medicine.wustl.edu/news/about/faculty-recognition/distinguished-faculty-awards/dfa-2016/wayne-m-yokoyama-md/</p>

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93	Robert D. Schreiber	https://pathology.wustl.edu/people/robert-schreiber-phd/
94	Andrey S. Shaw	https://medicine.wustl.edu/news/about/faculty-recognition/distinguished-faculty-awards/2012-2/andrey-s-shaw-md/
95	Gwendalyn Jan Randolph	https://pathology.wustl.edu/people/gwendalyn-randolph-phd/ Used with permission of Dr. Cote, Chair of Pathology and Immunology, WUSM
96	Paul Malone Allen	https://pathology.wustl.edu/people/paul-allen-phd/ Used with permission of Dr. Cote, Chair of Pathology and Immunology, WUSM
120	Michael Somogyi	Wikipedia: https://en.wikipedia.org/wiki/Michael_Somogyi
121	Carl Vernon Moore	Becker Library Archives: https://beckerarchives.wustl.edu/VC156-i156013
122	Virginia Minnich	Women in Medicine at WUSM: http://beckerexhibits.wustl.edu/women/minnich.htm
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125	Ethel Ronzoni Bishop	Wikipedia: https://en.wikipedia.org/wiki/Ethel_Ronzoni_Bishop
126	Anne MacGregor Perley	From the Anne MacGregor Perley Collection, Atomic Heritage Foundation: https://www.atomicheritage.org/profile/anne-m-perley
127	Hiromu Tsuchiya	Medical Journeys WUSM: Hiromu Tsuchiya (1887-1971): http://beckerexhibits.wustl.edu/mig/bios/tsuchiya.html
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135	Leonard Jarett	https://medicine.wustl.edu/news/obituary-leonard-jarett-former-director-laboratory-medicine-81/

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136	Jay McKay McDonald	ASIP Gold-headed Cane Award Winners 2011: https://www.asip.org/membership-community/awards-honors/meritorious-awards/asip-gold-headed-cane-award/ Used with permission of Dr. Gene Siegal, Department of Pathology, UAB
137	Joseph Paul Miletich	https://pathology.wustl.edu/about/history/ History of clinical labs at Barnes Hospital, Timeline, 1990-2000: A new era for genomics and molecular diagnostics worldwide Used with permission of Dr. Cote, Chair of Pathology and Immunology, WUSM
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143	David N. Dietzler	Photo in Ladenson research lab: University photo
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