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The Many

Pharmaceutical

Discoveries

of

Gertrude B. Elion

By

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Background

- Born January 23rd, 1918; died February 21st, 1999.⁹
- Graduated from Hunter College, a free all-girls college, with a bachelor's degree in chemistry in 1937.⁹
- Graduated from New York University with a master's degree in chemistry in 1941.⁹
- After college she worked at Wellcome Research Laboratories¹ as a lab assistant to Dr. George Hitchings.⁹
- Started a PhD at Brooklyn Polytechnic Institute; was unable to complete it due to work complications.^{1,9}
- Awarded honorary degrees from George Washington University, Brown University and the University of Michigan.^{1,9}

6-Mercaptopurine (6-MP)

- First drug synthesized by Elion and her team.¹
- Corrupts purine usage during DNA synthesis.¹
- First drug found to produce complete remission in the majority of child leukemia patients.¹
- FDA approved in 1953.¹
- Still in use today, but may harm patients with a genetic flaw on chromosome 6.^{2,3}
- Outside panel reviewing drug for the FDA currently.³

Azathioprine (AZA)

- Converted to 6-MP when taken but has a different effect.³
- Prevents the rejection of foreign tissue especially effective in kidney transplants.^{1,4}
- Use started in 1962.¹
- Still used today for kidney transplants and as a treatment for rheumatoid arthritis and ulcerative colitis.⁴
- Rejection rate in kidney transplants only 15% through the use of AZA.⁵
- Increased effect in people taking allopurinol.⁴

Allopurinol

- Blocks uric acid from forming.¹
- Uric acid is formed from purines as waste product during cellular respiration.⁶
- Buildup of uric acid can be from kidney disease, some chemotherapy drugs, eating foods rich in purines,⁶ and a deficiency in the enzyme Hypoxanthine-guanine Phosphoribosyltransferase (H-G PRTase).⁷
- Used in the treatment of gout – arthritic painful joints often with harden lumps of uric acid crystals.⁶



Elion in 1988 when she received the Nobel Prize in Physiology or Medicine.⁸

Awards & Achievements

- Awarded the Nobel Prize in Physiology or Medicine in 1988 along with Dr. George H. Hitchings and Sir James W. Black (Elion 1988).¹
- First woman admitted to the National Inventors Hall of Fame in 1991.¹
- Admitted to Engineering and Science Hall of Fame in 1991.¹
- Awarded the National Medal of Science in 1991.¹
- Awarded the Higuchi Memorial Award in 1995.¹

Acyclovir

- Antiviral drug used to fight herpes and shingles.¹
- Does not cure the disease; offers symptom relief and/or reduction.⁴
- Reduces pain experienced and the length of herpes or shingles outbreaks.⁸
- Treatment has to begin at first signs of an outbreak in order to have the best effect.⁸

Conclusion

Gertrude B. Elion achieved a variety of things in her brilliant scientific career which was very unusual for a woman born in 1918. She and her fellow researchers pioneered exploration into many areas of pharmaceutical development.⁹ Her groundbreaking research into purines led her to develop treatments for child leukemia and gout as well as a medication that would prevent the rejection of kidney transplants.¹ From her purine research, she then branched into antiviral research which led to a drug that is used to treat herpes, shingles and chicken pox. She also inspired a new generation of researchers who went on to discover even more revolutionary drugs such as azidothymidine (AZT).^{1,9} Many of these drugs they developed are still used today.^{1,9}

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