

Leena Peltonen

1952–2010

Leena Peltonen, one of the leading lights of the human genetics research community, passed away on March 11, 2010 at her home in Finland. Leena was born in Oulu, Finland, a town of approximately 100,000 people about 700 km north of Helsinki, in 1952. Her father was a civil servant and subsequently rector of the business school and her mother a teacher. She had one brother who developed type 1 diabetes from which he later died of complications. Leena recounted that this early intimate encounter with disease kindled her enthusiasm for medical research.

Leena graduated from high school top in her class, characterizing herself with typical self-deprecating humor as “a swot” (slang for an overzealous student), and proceeded to study medicine in Oulu. Following graduation, she obtained her first taste of research studying inherited collagen disorders, a subject that was an abiding interest for many years. Between 1978 and 1980 she undertook the first of several interludes of work outside Finland, a period of postdoctoral study at Rutgers University, New Jersey, where she attempted to characterize mutations in the inherited bone disease osteogenesis imperfecta through protein analysis. Transplanted from the relative quiet of provincial Finnish life into the penumbra of a great metropolis, she and her husband Aarno sampled with relish the nearby cultural riches of Manhattan, visiting the ballet and opera on 100 occasions within the space of 18 months. Leena then returned to Finland to continue work on connective tissue disorders, beginning to develop and apply the newly invented suite of recombinant DNA technologies to identify human inherited disease genes.

The Finnish population has an unusual history, developing from a small number of individuals who migrated in two major waves 4000 and 2000 years ago (from

the South and the East) and who subsequently remained relatively isolated. As a consequence of this founder effect, certain inherited diseases that are rare in most outbred populations turn out by chance to be relatively common in Finland, whereas others such as cystic fibrosis and phenylketonuria are relatively rare.

In 1985, Leena embarked on a highly fruitful and influential period of research studying the approximately 30 rare



Leena Peltonen
Photo courtesy of Tero Pajukallio.

recessive diseases that are particularly common in Finland. Using genetic linkage analysis and positional cloning, her group identified the underlying genes for 15 of these diseases, including those for autoimmune recessive endocrinopathy, Meckel syndrome, several lysosomal storage diseases, and neuronal ceroid lipofuscinosis. She further

elaborated this strategy by implementing the approach known as homozygosity mapping, which depends on consanguinity of parents of individuals with recessive diseases, using it to identify the gene responsible for infantile onset spinocerebellar ataxia. In 1998, she moved to the University of California Los Angeles (UCLA) where she spent 4 years establishing a major genetic research center.

Following this successful decade of research that established her as a scientist of international repute, Leena then attempted to further exploit the population structure of Finland to identify the genes for more common diseases using linkage analysis and positional cloning. This phase of study resulted in the identification of genes for familial hyperlipidemia and lactose intolerance.

In recent years, Leena began to use the fruits of the human genome sequence and HapMap projects, embarking on genome-wide association studies (GWAS) to identify low-penetrance susceptibility alleles. This period coincided with further stays abroad, notably at the Broad Institute of MIT and Harvard, where she became a much-loved member of the Medical and Population Genetics Program. These studies were predominantly focused on cohorts of normal individuals, many from Finland, in whom multiple quantitative traits, for example lipid levels, were systematically measured and represented the culmination of long years of data and sample collection. The National Public Health Institute of Finland had responsibility for monitoring the health of the Finnish population through epidemiological surveys. Starting in the late eighties, Leena forcefully encouraged the collection of samples for DNA extraction alongside accumulation of epidemiological data such that by the time the GWAS era arrived, hundreds of thousands of individuals who had been assiduously monitored for disease incidence had donated DNA samples. Leena's were among the first cohorts to be subjected to GWAS, research that resulted in the identification of genetic loci influencing lipid levels

and other quantitative traits. In large part as a result of her efforts, approximately 40,000 Finns have now been genotyped for hundreds of thousands of single-nucleotide polymorphisms, about 1% of the Finnish population.

Leena had a clear view of what was coming next. She joined the Wellcome Trust Sanger Institute in 2007, participating in the 1000 genomes project, energetically recruiting many new human genetics faculty, and beginning preparations for large-scale sequencing as the next step in the discovery of DNA variation implicated in disease susceptibility. She was co-PI on a large project to sequence 10,000 individuals from the UK that is just about to commence and was busily making plans for the application of large-scale resequencing to isolated European populations, in particular the Finns.

Leena was a celebrated and frequently spotted character on the scientific circuit. She was known for her warmth and flamboyant charm, for her distinctive and forceful voice, and for her bluntness, the latter trait one that she candidly and proudly attributed to her Finnish heritage. It was a mistake to underestimate her determination. She glued together large scientific consortia, which have become a signature of genetics in the last decade, through her intelligence, passion, force of character, charm, and where necessary, sharpness in the tackle.

Leena had a deep commitment to encouraging younger scientists, in particular women. She supervised over 70

PhD students and was vocal in scientific and national public forums concerning education and science policy. Her will to combine scientific career success with family was an inspiration for many younger scientists.

Leena received many marks of recognition during her career. Among these, she was a Member of the National Academy of Sciences of the USA and an Academician of Finland, one of 12 Academicians in post at any moment in time, a position held for life and the highest mark of scientific success in Finland.

She had a passion for life, science, and friendship. A chilled bottle of champagne was always at the ready in the event that a cause for celebration arose. Known for her striking dress sense, Leena loved the hubbub of parties with friends and was not averse to a spot of glamour, frequently and fondly recollecting a dinner at which she sat between Tom Cruise and Gregory Peck. She also, however, savored quiet private moments, curled up on the sofa at her farmhouse on an island in the Finnish archipelago with her family around her.

She met her husband, Aarno Palotie, in 1976 during a microscopy lesson in which he was one of a class of medical students and Leena was the anatomy demonstrator. Leena asked who could see mitochondria and Aarno hotly retorted that you could not possibly see them using a light microscope. The romantic spark kindled by this moment was sustained throughout their life together during which they

were inseparable in work, travel, leisure, and the upbringing of their children Laura, now a journalist, and Kristian, a student.

Leena was diagnosed as having an osteosarcoma in 2008. Over the subsequent 18 months the cancer became widely metastatic. Her profound belief in the scientific method and modern genetics and genomics led her to invite a team of scientists to apply the most up-to-date strategies for disease monitoring and therapy. She insisted on additional painful surgery in order to obtain samples from which cell lines and xenografts were cultured and the genome of her cancer was sequenced. As it sadly became clear that these efforts were not helping her own case, Leena instructed that work continue in this vein on her cancer as the model of an approach that would ultimately benefit others.

Leena was literally a household name in Finland. She was frequently on national television promoting science and the role of the Finnish heritage and expounding strongly held views on education. She was a fierce proponent of women fulfilling their career ambitions and having a full family life. Two days before she died, Finland marked International Women's year by releasing postage stamps honoring six notable Finnish women, of whom Leena was one. Her death was the main front-page feature of Finnish newspapers and the first item of the day's television news broadcasts.

At Leena's funeral, a leopard-skin stiletto shoe was placed on her coffin.

Michael R. Stratton^{1,*} and Eric Lander²

¹Wellcome Trust Sanger Institute, Hinxton, Cambridge CB10 1SA, UK

²Broad Institute, Cambridge, MA 02142, USA

*Correspondence: mrs@sanger.ac.uk

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