Angelo M DiGeorge

Paediatric endocrinologist who discovered the role of the thymus gland in human immunological function

Angelo DiGeorge was growing more and more excited as he listened to Max Cooper describe “a new concept of the cellular basis of immunity.” DiGeorge, a paediatric endocrinologist in Philadelphia at St Christopher’s Hospital and Temple University School of Medicine, was listening from the audience of the 1965 meeting of the US Society for Pediatric Research.

Dr Cooper was reporting “experimental evidence” that indicated that the lymphoid system is composed of two distinct cell populations, each with a separate embryological origin and different morphological and functional characteristics. But his evidence was based primarily on research in chickens, not humans. When Dr Cooper showed that he and his University of Minnesota colleagues thought a dual immune system also existed in mammals, the scepticism emanating from the audience was palpable, recalls Dr Cooper, now at the Emory University School of Medicine in Atlanta.

“It was not a very Darwinian audience,” he said. Audience members tittered when the questioner approached the microphone and quipped that caution was called for when trying to compare the immune systems of chickens with humans.

DiGeorge was not laughing. When the first questioner finished, he sprang up and hurried toward the microphone, shouting, “That’s it. That’s it. That explains what we have been seeing in Philadelphia.”

By the time he had finished speaking the audience was no longer giggling. DiGeorge had a solid reputation. “I could have hugged him,” Dr Cooper said. “He rescued me. His comments changed the whole atmosphere in that room.”

No trace of a thymus

DiGeorge had told the audience of his investigations of three infants with tetany because of hypoparathyroidism. After their deaths, autopsies showed no trace of a thymus, an organ that until the early 1960s was thought to have no function. Immunologists had recently recognised an immunological function for the thymus, but he explained that paradoxical finding of plasma cells with an immunological function for the thymus, but he explained that paradoxical finding of plasma cells that produce antibodies in infants born with no thymus, which had not yet come to the attention of these immunologists.

DiGeorge added that the absence of cellular immunity coupled with retention of humoral immunity he saw at St Christopher’s Hospital in a fourth infant, still alive but whom he suspected had no thymus, seemed to be “completely analogous” with Dr Cooper’s chickens. These findings in humans clearly showed that the thymus is not the source of our antibody producing cells.

The still living infant with immune problems referred to by DiGeorge eventually died, and the autopsy showed no thymus. DiGeorge coauthored the groundbreaking paper published in Nature that described the syndrome, initially presumed rare, but now known as a common genetic disorder, occurring in more than one in 4000 live births (Nature 1967;214:580-2, doi:10.1038/214580a0). Robert A Good, a founder of modern immunology and at the time Dr Cooper’s mentor at the University of Minnesota, suggested the condition be named the DiGeorge syndrome. It was later learnt that affected patients have a small deletion on chromosome 22, and now the syndrome is commonly called 22q11.2 deletion syndrome, responsible for a long list of symptoms.

Donna M McDonald-McGinn, programme director of the 22q and You Center at the Children’s Hospital in Philadelphia and a board member of the International 22q11.2 Deletion Syndrome Foundation, said of DiGeorge’s discovery, “It was revolutionary. It had a huge impact. At the time a lot of kids did not survive [DiGeorge syndrome]. It was extremely important for the management of the children.”

News of his death circulated by Internet around the world among various 22q11.2 deletion syndrome groups. Anne Lawlor, chairwoman of the 22q11 Ireland Support Group, said, “I feel a connection to the man because that is the diagnosis my daughter was given at 15, DiGeorge syndrome.”

Chemistry degree

Angelo M DiGeorge was born on 15 April 1921 in Philadelphia, the son of Italian immigrants. He attended Temple University, earning a chemistry degree in 1943 and three years later his medical degree, also at Temple. After completing his internship at Temple University Hospital, he served from 1947 to 1949 as captain and chief of medical service for a US army station hospital in Austria.

After his return to Philadelphia he met his future wife, Natalie Picarello, a registered nurse. He completed his pediatric residency at St Christopher’s Hospital for Children and did a postdoctoral fellowship in endocrinology at Jefferson Medical College in 1954. DiGeorge joined the department of paediatrics of Temple University School of Medicine in 1952. He was also an attending physician at St Christopher’s, where he became the chief of endocrinology and metabolism from 1961 to 1989 and the director of the Pediatric Clinical Research Center from 1965 to 1982. After retirement in 1991 he became professor emeritus.

Iraj Rezvani, who in 1971 began a paediatric endocrinology fellowship under DiGeorge, described his mentor as “a superb teacher, a masterful lecturer, a brilliant diagnostician, a caring physician, and a warm-hearted man.” He was also a man of strong convictions and opinions who loved to debate with colleagues, friends, and family. “If he had an opinion, he defended that opinion all the way,” said Dr Rezvani.

DiGeorge’s discovery is even more remarkable because he was an endocrinologist, not an immunologist, with no access to modern diagnostic equipment, he said.

The discovery was not luck, though, but the result of a well prepared mind. “He was very well read,” Dr Rezvani said. “He was a true scientist, a great thinker. He was a good man of strong convictions, ready to debate with friends, and family.” If he had an opinion, he defended it all the way.”

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Jannine Forssander
Emeritus professor of cardiology
University of Amsterdam and former editor in chief Nederlands Tijdschrift voor Geneeskunde (Dutch Journal of Medicine) (b 1930, q Amsterdam 1958; MD, PhD), died from complications after surgery for oesophageal cancer on 6 October 2009.
A manager with unsurpassed people skills, Arend Jan Dunning (“Ad”) was also an intellectual, publishing several books on the powerlessness of medicine. As adviser to Elsevier, he fostered its acquisition of the Lancet. His regular columns for the newspaper NRC-Handelsblad were universally acclaimed for their breadth and candour, but his political ambitions foundered after his plans to reform Dutch health care on British and Scandinavian models were rejected for a market driven approach. The survival of “his” journal is largely through his efforts to adjust to the digital age. He leaves a wife, Trudy; three children; and five grandchildren.
John Overbeke
Leo Offerhaus
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James Howard Lewis
Former medical officer Civil Aviation Authority, group captain Royal Air Force (b 1910; q Oxford/Charing Cross 1936; MA, DPH), d 23 April 2008. James Howard Lewis (“Howard”) spent most of the second world war, and until independence, in India, eventually becoming officer commanding the RAF hospital in Cawnpore, then Barrackpore. After a year at the US Academy of Aviation Medicine, Texas, he was posted to the Institute of Aviation Medicine, Farnborough, where he became a commanding officer. He subsequently became deputy director of aviation medicine; his last posting was to the Second Allied Tactical Air Force in Germany. After retirement, he was a medical officer with the Civil Aviation Authority for 10 years. Predeceased by his wife of 67 years, Jeanne, and by his daughter, he leaves two sons and six grandchildren.
Rollo Lewis
Cite this as: BMJ 2009;339:b4464

James Lionel Somervell
Former consultant surgeon Jammalamadugu, Andhra Pradesh, India, and Walsall (b 1927; q Cambridge/University College Hospital, London, 1951; FRCS 1960), died from subarachnoid haemorrhage on 20 August 2009. After qualification and posts in England and Vellore, south India, James Lionel Somervell (“Jim”) worked for 14 years in the Church of South India’s Jammalamadugu Hospital. After registrar posts in Birmingham, he was a consultant surgeon in Walsall from 1970 to 1989, working as a general surgeon with a special interest in upper gastrointestinal and breast surgery. Medical representative to the hospital board, he also had a special affinity with people from the Indian subcontinent and a splendid sense of humour. Family and church were central to Jim’s life, and he strongly supported the ordination of his wife, Mary. He leaves Mary, three children, and seven grandchildren.
William A M Cutting
Cite this as: BMJ 2009;339:b5008

Arthur Powell Wyatt
Former consultant surgeon Greenwich Health District, London (b 1932; q St Bartholomew’s Hospital, London, 1955; FRCS), d 11 October 2009. Arthur Powell Wyatt spent his early childhood in China, where his father was a missionary doctor. After surgical training in London and a year’s research in San Francisco, he was appointed consultant to the Brook Hospital, London. He made original observations on pneumatosis coli and biliary reflexes, and was equally respected as a vascular and abdominal surgeon. His honours and appointments included being secretary to three sections of the Royal Society of Medicine. He became visiting professor to the Shanxi Cancer Hospital at Taiyuan in China and visiting surgeon to hospitals in Sichuan province. He leaves a wife, Margaret; three sons; and six grandchildren.
Edward Wyatt
George Wyatt
Cite this as: BMJ 2009;339:b5165

Cyril Forssander
Former medical officer Canadian Immigration Service (b 1913; q Middlesex 1938), d 4 October 2009. Cyril Forssander was a medical practitioner until the age of 60, and then a fulltime painter for 30 years. Shortly after graduation, he joined the Royal Air Force, serving with fighter squadrons until invalided-out after a serious accident. He was a general practitioner in Norfolk until 1949, when he emigrated to Vancouver, where he treated patients with tuberculosis until the advent of streptomycin. At the University of Pennsylvania he did research in applied physiology before finally working for the Canadian Immigration Service in London, Rome, and Copenhagen. In retirement he moved to Brittany, and was well-known as a painter in the Côtes d’Armour, being artist of the year in 2004. He leaves a wife, Jannine, and a daughter.
Rosalind Anfilogoff
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Michael Ernest Nicholas Anfilogoff
Former general practitioner Upminster, Essex (b 1931; q University College Hospital, London, 1953), died from pancreatic cancer on 5 March 2009. After qualifying, Michael Ernest Nicholas Anfilogoff (“Dr Michael”) returned to Hornchurch to complete his national service in the Royal Air Force. He subsequently joined his uncle and his cousin (John Anthony (“Dr John”)) in practice in Upminster. Dr Michael developed an interest in counselling techniques, in the 1960s joining one of the first groups run by Balint and using the techniques throughout his career. In 1979 he became a clinical assistant in dermatology. Despite retiring from general practice in 1996, he continued to work as an associate specialist in dermatology until he was diagnosed with pancreatic cancer at the age of 77. He leaves a wife and three children from his first marriage.

John Roslyn Anthony
Former general practitioner Upminster, Essex (b 1932; q Royal London Hospital 1955), died from neutropenic sepsis on 15 June 2009. John Roslyn Anthony (“Dr John”) left school at 16 to study medicine, first at Queen Mary College and then the Royal London Hospital. Initially planning a career in oncology, he was persuaded into general practice with his father in 1958, later being joined by his cousin (Michael Anfilogoff (“Dr Michael”). Dr John was proud to have looked after five generations of the same family. A talented shooter, he represented his country nationally and internationally, participating in the Olympics in 1972 and 1976. After retiring from general practice, he was an adviser to Havering Primary Care Trust, attending meetings three days before he died. He leaves his second wife, Sheelah, and six children and grandchildren.
Jennifer Anthony
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