Hla (Human Leucocyte Antigen) Encyclopedia Article

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After George Snell (1903-1996) discovered histocompatibility (tissue-compatibility) genes in mice, and showed that they were physically linked in the major histocompatibility complex (MHC), the question arose if an MHC also existed in human beings. The question was answered by the French immunologist Jean Dausset.

Working at the French National Blood Transfusion Center, Dausset studied abnormal reactions to blood transfusions. He found that patients who had received many transfusions developed reactions to donated white blood cells. In 1952, Dausset discovered an antigen on white blood cells that stimulated antibody production in a blood recipient whose white cells did not contain the antigen. By 1958 Dausset had found a variety of these white blood cell antigens, which he called MAC. Since MAC-positive blood always caused anti-MAC antibodies to form in MAC-negative blood recipients, Dausset suggested that this MAC antigen could be a contributing factor in the body's acceptance or rejection of foreign tissue.

By 1965, researchers had discovered so many histocompatibility antigens in addition to the MAC forms, a conference was convened to sort out and consolidate the findings. Dausset hypothesized, and later proved, that all of the antigens were part of a single system, arising from a single set of human MHC genes. This complex was called the human leucocyte (white blood cell) antigen (HLA) group. Since each gene involved occurred in many variant forms (*alleles*), a vast variety of HLA transplantation antigens were possible.

In 1967 Dausset studied skin grafts among members of the same family and proved that success was dramatically higher when donor and recipient had the same HLA type, confirming the value of HLA tissue-typing to predict compatibility in organ transplantation. Also in 1967 Dausset began researching the connection between a person' s HLA types and that person's susceptibility or predisposition to particular diseases. Since each individual has a unique genetic configuration of HLA, and since HLA powerfully affects how the body 's immune system works, Dausset reasoned that a link between HLA and risk for disease was a strong possibility. Following up on Dausset's pioneering work, other researchers have shown such a connection in the case of some diseases, including diabetes and autoimmune disorders. Further research in this area holds the promise of dramatic progress in prevention of disease.

In 1987 two researchers at Harvard, Jack Strominger (1925-) and Donald Wiley (1944-), discovered the actual physical structure of the HLA molecule.