Definition: **Edelman, Gerald Maurice** from *The Hutchinson Unabridged Encyclopedia with Atlas and Weather Guide*

US biochemist who was awarded a Nobel Prize for Physiology or Medicine in 1972 with Rodney Porter for their work on the chemical structure of antibodies. Edelman worked out the sequence of the 1,330 amino acids that makes up human immunoglobulin, a task completed in 1969. He was head of the Neurosciences Institute, La Jolla, California.

**quotations**

Edelman, Gerald Maurice

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**Summary Article: Edelman, Gerald Maurice**

from *Encyclopedia of Life Sciences*

**Abstract**

1929- American molecular biologist pioneer in the study of the molecular structures of antibodies.

**keywords**

immunoglobulins

R. R. Porter

Gerald Edelman was born on 1 July 1929 in New York, the son of a physician. Graduating from Ursinus College, Pennsylvania in 1950 he studied medicine at the University of Pennsylvania Medical School, where he gained the MD in 1954. After a year as a medical house officer in Massachusetts General Hospital he served with the US Army medical corps in Paris. In 1957 he went to the Rockefeller University in New York City where, following his PhD in 1960 for a study of the immunoglobulins, he joined the staff. Produced on the surface of β-lymphocytes, the immunoglobulins are released into the body fluids as antibodies, each capable of combining with a particular antigen. They are part of the vertebrates’s defence against infection. Edelman found human immunoglobulin to be a large protein molecule consisting of two kinds of protein chains, 'light' and 'heavy', linked by bridging sulfur atoms. Rodney R. Porter proposed a four-chain structure for the molecule of immunoglobulin G (IgG) and Edelman proceeded to study the sequence of amino acids in the chains. He recognized that Bence-Jones proteins, first discovered in 1847, were structurally similar to the light chains of antibodies. By 1969, with his research team, he succeeded in constructing a precise model of the entire molecule consisting of more than 1300 amino acids. Most of the molecule was unchanging, but the tips of the chains were highly variable and it seemed likely that these areas would be identified with the active antigen-binding regions, their variability enabling IgG to bind many different antigens. In 1970 Edelman
argued for a major modification of the clonal theory of antibody formation proposed by Macfarlane Burnet in 1957. Edelman suggested that the signal to the immune system to increase production was the change in shape of the antibody molecule as it combined with an antigen. In 1972 Edelman and Porter shared the Nobel Prize in Physiology or Medicine. See also Porter, Rodney Robert, Antibodies, Antibody Function, Antigen-Antibody Binding, and Burnet, Frank Macfarlane

Edelman subsequently worked on morphogenesis (the formation and differentiation of tissues and organs). In 1975 he and his colleagues discovered the proteins called cell-adhesion molecules, which act to attach individual cells to one another to form tissues. See also Adhesive Specificity and the Evolution of Multicellularity

Similarities between the immune and nervous systems led Edelman to investigate the neurosciences. He suggested that just as a lymphocyte can recognize and respond to a new antigen, so the nervous system can respond to novel stimuli. Appointed Director of the Neurosciences Institute at Rockefeller University in 1981, Edelman proposed a new theory of neural development and brain function in which the variations in the connections between nerve cells account for the variety of brain function between individuals. Frequently used connections will be selected, but others will decay or be used for other purposes. He argued that developmental selection occurs before birth and is followed by experiential selection; there are also 'innate values', built-in preferences for such features as light and warmth. Edelman also suggested that higher consciousness, including self-awareness and memory, requires the emergence of new neuronal circuits. These views were considered obscure by some neurologists and have not been accepted widely. See also Neural Activity and the Development of Brain Circuits, and Consciousness

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