European Review, Vol. 32, No. 4, 343–345

doi:10.1017/S106279872500002X

Academia Europaea
The Academy of Europe

The Academia Europaea are pleased to award an Erasmus Medal to the internationally renowned Neuroscientist

Professor Jean-Pierre Changeux MAE

'The Erasmus Medal of the Academia Europaea is awarded to a European scholar who has maintained over a sustained period of time an outstanding level of international scholarship as recognized by peers. It is perhaps the highest recognition for purely scholarly achievements that the Academy can bestow on a scholar. The Medal is awarded at the Annual Conference of the Academy and on that occasion the recipient will give the Annual Erasmus Lecture.'

Jean-Pierre Changeux has been the leader in the field of receptor research and neuroscience for the past half a century. His thorough dissection of the nicotinic acetylcholine receptors is a landmark in modern biology. The extension of the allosteric theory to membrane proteins provided a mechanistic explanation for the process of signal transduction by ligands. It has vast implications in several fields of biology, including receptor biology, cellular communications, drug design and development, and neuroscience. Due to his pioneering and seminal activities, Changeux is one of the key founders of modern molecular pharmacology and neuroscience.

As a graduate student in the laboratories of Nobel Laureates Jacques Monod and François Jacob, Changeux's studies provided a fundamental mechanism of protein regulation, the allostery model, with a profound impact on the biology of living organisms. He further proposed that allosteric regulation in membrane receptors plays a key role in the transmission of chemical signals in the nervous system. He hypothesized that the acetylcholine receptor could be envisioned as a membrane macromolecule in which the acetylcholine binding site regulates by an allosteric conformational change, the gating of an ion channel. His subsequent career strategically and comprehensively validated this pioneering insight, resulting in a series of important discoveries.

Changeux's seminal work on the nicotinic receptor forged new fields of research in signal transduction mechanisms, molecular pharmacology, and pathological modifications of chemical communications in the nervous system, including the subsequent molecular identification of brain ionotropic glutamate and GABA receptors. Following Changeux's pioneering work, the notion that receptor activity is controlled by allosteric mechanisms has been extended to G protein-coupled receptors and growth-factor receptors. It is now well-established that ligand binding triggers an allosteric transition that activate or inhibit the G proteins or activate receptor tyrosine kinases.

Subsequently, Changeux used his knowledge of the nicotinic receptors to investigate higher levels of brain organization, in particular the way these receptors participate in reward and cognition. Moving from the molecules and the isolated neurons or muscle cells to the development of neuronal networks, Jean-Pierre Changeux made an outreaching contribution by proposing the theory that long-term epigenesis of neuronal networks occurs by the selective stabilization and elimination of developing synapses. In parallel, he proposed, with his collaborators, theoretical models for defined cognitive tasks that bridge the gap between molecular biology and cognitive science. In these models, allosteric receptors play a key role in the regulation of synaptic efficacy. Changeux and his colleagues further proposed an original hypothesis describing a neuronal mechanism for conscious access, implicating a 'global neuronal workspace' composed of a brain-scale horizontal network of reciprocally connected long axon pyramidal neurons.

Finally, throughout his career, Jean-Pierre Changeux has been concerned by the ethical consequences of neuroscience for medicine and for society in general. He has written a number of books, including the iconic 'L'homme neuronal', which not only reveals his status as a leading contemporary figure in neuroscience but also one of the leading thinkers of our times and a worthy contemporary heir of the French Encyclopaedists of the 18th century.

Professor Changeux received the Erasmus Medal and delivered the accompanying Academia Europaea–Heinz-Nixdorf Erasmus Lecture at the annual conference of the Academia Europaea, Munich, on 10 October 2023.

Ole Petersen MAE gave the laudation. He is Professor at the Cardiff School of Biosciences, Cardiff University, Wales, UK, and Academic Director of the Academia Europaea Cardiff Knowledge Hub.

The Award is sponsored by the Heinz Nixdorf Stiftung:

Heinz Nixdorf Stiftung

1. Heinz Nixdorf Stiftung is – together with Stiftung Westfalen – one of the two non-profit foundations, which have been established from the assets of the estate of the entrepreneur Heinz Nixdorf, who died in 1986. The foundation promotes the following:
   a) the (advanced) professional education, especially in the field of modern technology,
   b) the sciences in respect of research and teaching, especially in the field of information technology,
   c) the liberal and democratic governmental system, especially the 'Soziale Marktwirtschaft',
   d) public health,
   e) sports.

   The foundation realizes its purposes primarily in cooperation with other non-profit institutions.
2. Heinz Nixdorf Stiftung promotes among others the Heinz Nixdorf MuseumsForum in Paderborn. This is a non profit institution combining in a unique way the classic historic dimension of a museum with the current and future-oriented topics of a forum.

   Heinz Nixdorf MuseumsForum is the largest computer museum in the world.