Prof. George Emil Palade
Professor of Medicine in Residence, Emeritus, and Dean for Scientific Affairs, Emeritus, University of California, San Diego

Most important awards, prizes and academies

Awards: Lasker Award (1966); Gairdner Special Award (1967); Nobel Prize in Physiology or Medicine (1974); Louisa Gross Horwitz Prize (1970). *Academies*: National Academy of Sciences, USA; Foreign Member, American Academy of Arts and Sciences; Royal Society; Foreign Member, Leopoldina Academy, Germany; Foreign Member, Romanian Academy; Pontifical Academy of Sciences.

Summary of scientific research

His work in cell biology started with a survey at the electron microscope level of the organization of eukaryotic cells and led to the discovery of a number of important structures (or structural details) in mitochondria, endoplasmic reticulum, ribosomes and polysomes. The salient achievement of that period was the discovery of ribosomes. From electron microscopy he moved to cell fractionation (controlled by microscopy) to help define in chemical and functional terms many subcellular components such as ribosomes, polysomes, mitochondria, nuclei and cell membranes. In the process he contributed to the improvement of preparatory procedures in electron

microscopy as well as in cell fractionation. From this level of inquiry, he proceeded to the analysis of a complex process, namely, the processing of secretory protein in grandular cells, using an integrated approach based on electron microscopy, cell fractionation and autoradiology. This was, in fact, the work that in his judgement justified the Nobel Prize he received. The results defined kinetically the pathway followed by secretory protein in eukaryotic cells and became the basis for further work in his and many other laboratories. In the next phase of my research activities he concentrated on membrane biogenesis defining again the conditions under which membranes, especially membrane proteins, are synthesized and processed by eukaryotic cells. Finally, in a separate type of investigation, he worked on the structure and function of the vascular endothelia, concentrating primarily on structures involved in exchanges between the blood plasma and interstitial fluid. This project had obvious implications for normal physiology and important medical problems related to cardiovascular diseases.

Main publications

Palade G. (1975) Intracellular aspects of the process of protein synthesis. *Science* 189(4200):347-58; Howell KE, Palade GE. (1982) Hepatic Golgi fractions resolved into membrane and content subfractions. *J Cell Biol* 92(3):822-32; Palade GE. (1983) Membrane biogenesis: an overview. *Methods Enzymol* 96:XXIX-LV; Sztul ES, Howell KE, Palade GE. (1985) Biogenesis of the polymeric IgA receptor in rat hepatocytes. II. Localization of its intracellular forms by cell fractionation studies. *J Cell Biol* 100(4):1255-61; Sztul E, Kaplin A, Saucan L, Palade G. (1991) Protein traffic between distinct plasma membrane domains: isolation and characterization of vesicular carriers involved in transcytosis. *Cell* 64(1):81-89; Jacobson BS, Schnitzer JE, McCaffery M, Palade GE. (1992) Isolation and partial characterization of the luminal plasmalemma of microvascular endothelium from rat lungs. *Eur J Cell Biol* 58(2):296-306; Saucan L, Palade GE. (1994) Membrane and secretory proteins are transported from the Golgi complex to the sinusoidal plasmalemma of hepatocytes by distinct vesicular carriers. *J Cell Biol* 125(4):733-41; Palade GE. (1995) Protein kinesis: the dynamics of protein trafficking and stability. *Cold Spring Harb Symp Quant Biol* 60:821-31; Predescu SA, Predescu DN, Palade GE. (1997) Plasmalemmal vesicles function as transcytotic carriers for small proteins in the continuous endothelium. *Am J Physiol* 272(2 Pt 2):H937-H949; Roberts WG, Palade GE. (1997) Neovasculature induced by vascular endothelial growth factor is fenestrated. *Cancer Res* 57(4):765-72.