Honoring Rodolfo R. Llinás for Excellence in Exocytosis and Endocytosis Research

Rodolfo Llinás (b. Bogotá, Colombia in 1934) is the Thomas and Suzanne Murphy Professor of Neuroscience and Chairman of the Department of Physiology & Neuroscience at the NYU School of Medicine. He went to the Gimnasio Moderno school and received his MD from the Universidad Javeriana, Bogotá in 1959 and his PhD in 1965 from the Australian National University working under Sir John Eccles. Rodolfo was selected by the BPS Exocytosis & Endocytosis Subgroup to receive the "**Sir Bernard Katz Award**" for excellence in Exocytosis & Endocytosis research. Sir Bernard Katz established the exocytotic nature of synaptic transmission and discovered the ligandgated channel basis for the post-synaptic response. He is one of the founding fathers of biophysics and neuroscience. This award recognizes scientists who have made significant contributions to the field.

Professor Rodolfo R. Llinás is being honored for his work on the squid giant synapse, which laid the foundation for much of our current understanding of the biophysics of intracellular calcium in the exocytosis of transmitter release. Llinás and his colleagues demonstrated that it was not the action potential *per se* invading the presynaptic terminal that was needed for release, but rather calcium entry. He was the first to show directly that a rise in intracellular calcium caused exocytosis in the first imaging study of a calcium indicator in the presynaptic terminal. His was the first determination of presynaptic calcium current, under voltage- clamp. His papers on the timing relationship between calcium entry and exocytosis set one of the main constraints on the mechanism by which calcium triggers fusion: it must be able to occur in less than 200 microseconds. These findings led to the landmark modeling of presynaptic calcium dynamics and its relationship to exocytosis, including explaining how local domains of calcium at the sites of entry could give calcium levels much higher than previously thought. This idea has had a profound effect on the field, in terms of the way we relate physiological response to in vitro calcium binding constants of putative calcium sensor molecules, and mechanisms of plasticity involving residual calcium. Pioneering work with injection of proteins,

initially synapsin, began the modern era of combining biochemistry and electrophysiology. Importantly, Rodolfo has been an indefatigable champion of research and researchers in exocytosis, with his influential seminars, organized symposia, and his writing. The subgroup would also like to particularly recognize his colleagues, including Mutsuyiuki (Sugi) Sugimori Sugamori, Kerry Walton, Sanford M. Simon, Itzhak Steinberg, for their contributions to the above work.

Professor Llinás will deliver the keynote talk entitled "**Of calcium**, **molecules and a giant synapse: function and dysfunction**," at the Exocytosis & Endocytosis Subgroup Symposium in Baltimore, MD on Saturday, March 5, 2011.