NUS National University of Singapore | Department of Biological Sciences, Faculty of Science

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PUBLIC LECTURE

Tues, 6 Jan 2026 | 2 pm | LT32

Hosted by Assoc Prof Roman Carrasco

Unconventional secretion: Extracellular vesicles, RNA and alpha-synuclein

2013 Nobel Prize Winner

By

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About Prof Randy Schekman

Two types of extracellular vesicles (EVs), microvesicles and exosomes are secreted by mammalian cells in vivo and in vitro. We have evaluated the molecular mechanism by which certain RNA-binding proteins and micro RNAs are captured into exosomes for secretion by cultured mammalian cells. Although EVs have been reported to be vehicles for the intercellular transfer of cargo proteins and RNA, we found that conditions of stress and damage to the cell surface result in a substantial stimulation of microvesicle and exosome secretion as a by-product of a plasma membrane repair process with little evidence of cargo transfer to target cells.

Another form of unconventional secretion allows certain proteins that lack a signal peptide to be translocated across a membrane independent of the ER Sec61 channel. We have analyzed the path taken by alpha-synuclein (a-syn), a small relatively unstructured protein that is genetically implicated in Parkinson's Disease (PD). a-syn in the cytoplasm is transferred into the endosome from which it is secreted by membrane fusion at the cell surface. We have uncovered a set of endosomal membrane proteins that may form a receptor or channel for endosomal localization. This novel path may be responsible for the pathological spread of alpha-synuclein in the brain of patients afflicted with PD.