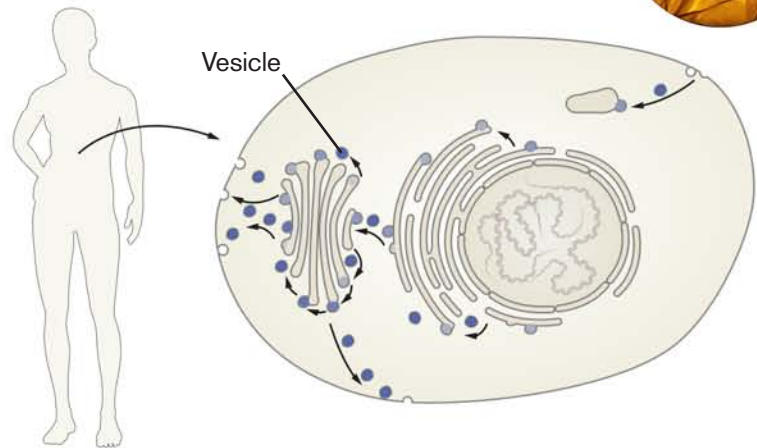


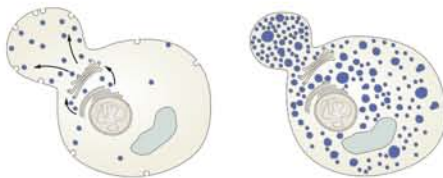
# The Nobel Prize in Physiology or Medicine 2013



Proper functioning of the cells in the body depends on getting the right molecules to the right place at the right time. Some molecules, such as insulin, need to be exported out of the cell, whereas others are needed at specific sites inside the cell. Molecules produced in the cell were known to be packaged into vesicles (pictured in blue), but how these vesicles correctly deliver their cargo was a mystery.



Randy W. Schekman

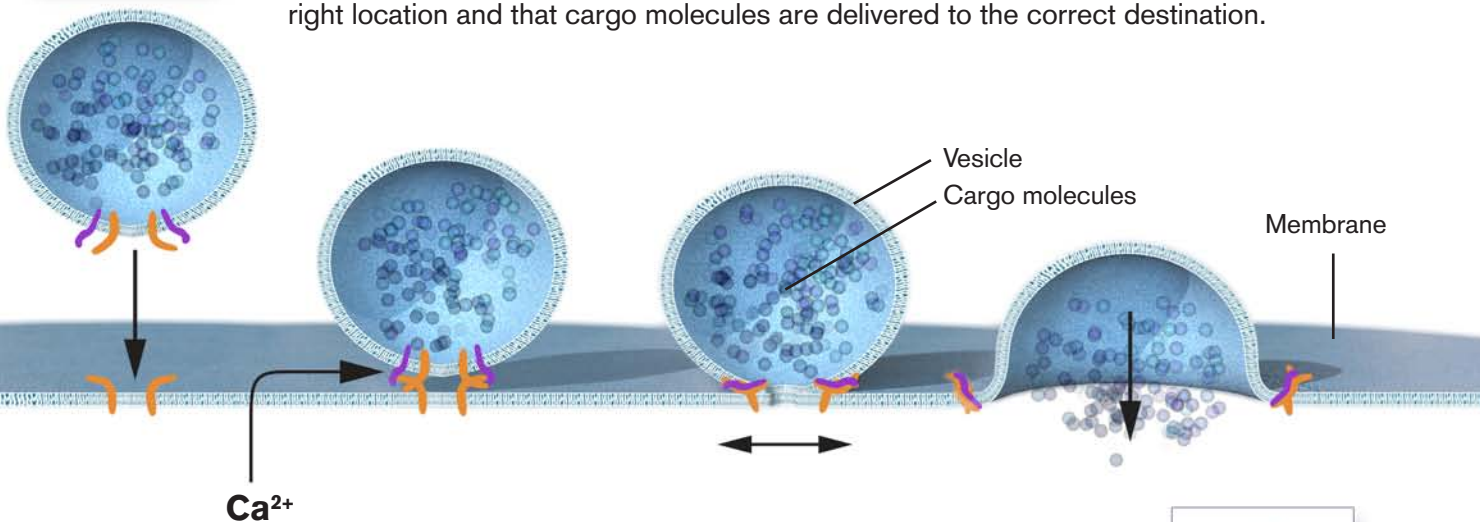


**Randy W. Schekman** discovered genes encoding proteins that are key regulators of vesicle traffic. Comparing normal (left) with genetically mutated yeast cells (right) in which vesicle traffic was disturbed, he identified genes that control transport to different compartments and to the cell surface.



James E. Rothman

**James E. Rothman** discovered that a protein complex (pictured in orange) enables vesicles to fuse with their target membranes. Proteins on the vesicle bind to specific complementary proteins on the target membrane, ensuring that the vesicle fuses at the right location and that cargo molecules are delivered to the correct destination.



Thomas C. Südhof



**Thomas C. Südhof** studied how signals are transmitted from one nerve cell to another in the brain, and how calcium controls this process. He identified molecular machinery (pictured in purple) that senses calcium ions ( $\text{Ca}^{2+}$ ) and triggers vesicle fusion, thereby explaining how temporal precision is achieved and how signaling substances can be released from the vesicles on command.