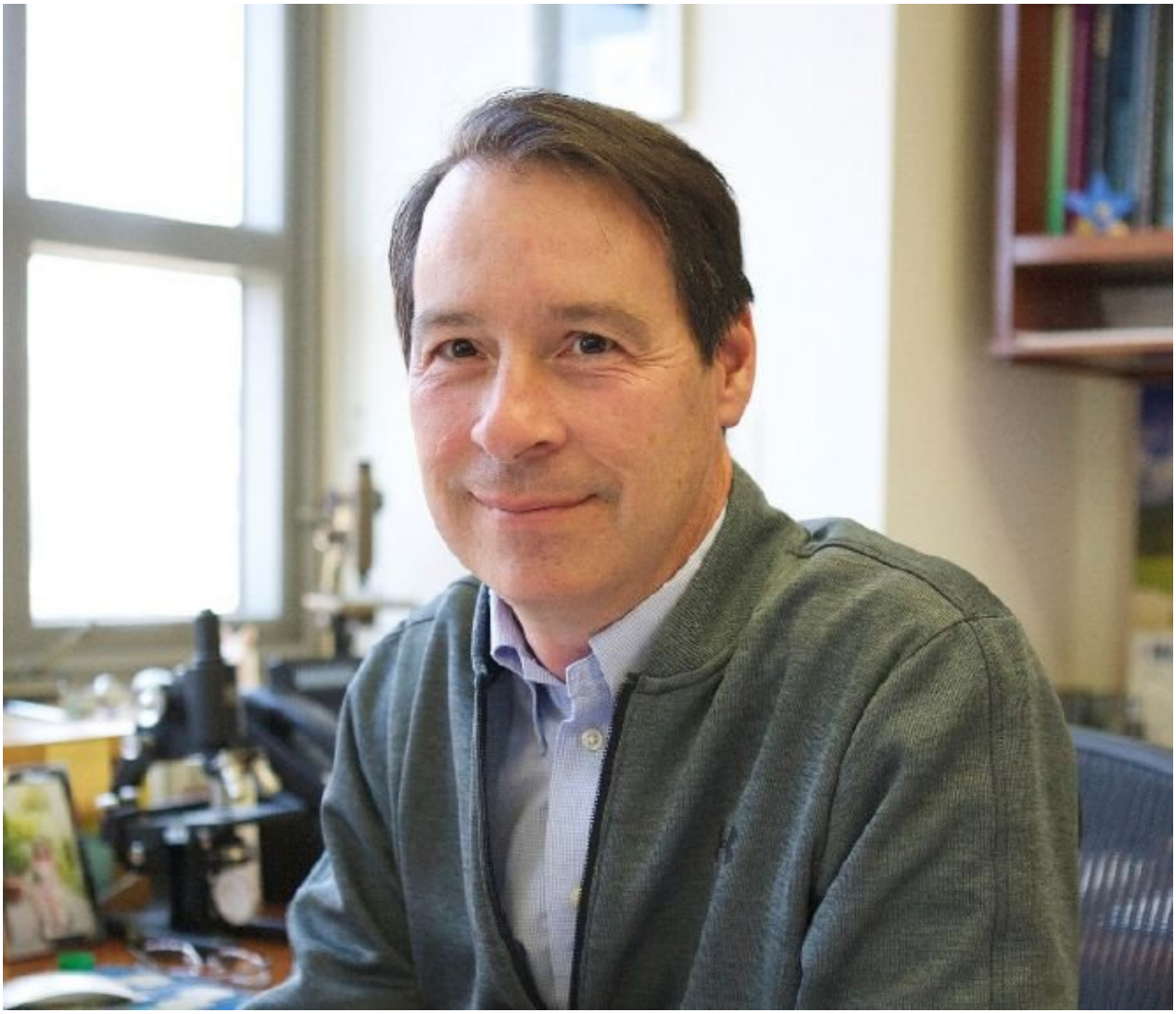
# Team determines how cholesterol moves inside cells

November 14 2018, by Alice Walton



The senior author of the study is Dr. Peter Totonoz, a professor of pathology and laboratory medicine at the David Geffen School of Medicine at UCLA. UCLA Health

Researchers have found that high-density lipoprotein, or HDL, sometimes referred to as "good" cholesterol, is transported from the outer wall to the interior of cells by a protein that helps create a "bridge" between the two areas.

HDL cholesterol has been linked for years to a reduced risk of coronary heart disease. Recent studies, however, have raised questions about how it actually affects heart risk, suggesting that how HDL cholesterol circulates, rather than its concentration, may have more to do with disease risk. In this study, the researchers set out to determine how HDL cholesterol moves from the cell's outer membrane to areas inside the cell, which had previously been a mystery.

The researchers suspected that proteins called Asters might be responsible for carrying HDL cholesterol from the cell membrane to the interior of the cell. Asters are tethered to a structure inside the cell called the endoplasmic reticulum, a network of membranes inside the cell. The team first isolated the region of the Asters most likely to bind cholesterol, and found that the Asters did bind. The region also efficiently transferred cholesterol molecules between two artificial membranes in a test tube.

The team also studied mice lacking one of the three Asters, and confirmed that it is required for HDL movement from the cell membrane into the endoplasmic reticulum in the adrenal gland, which uses cholesterol to make steroid hormones such as cortisol.

Understanding how cholesterol is transported into cells may lead to new ways to diagnose and treat high cholesterol and other blood lipid disorders in humans. Altered cholesterol metabolism is linked to sometimes-fatal diseases including coronary heart disease. This study

may help pave the way for new diagnostic and therapeutic tools for these diseases.

**More information:** Jaspreet Sandhu et al. Aster Proteins Facilitate Nonvesicular Plasma Membrane to ER Cholesterol Transport in Mammalian Cells, *Cell* (2018). DOI: 10.1016/j.cell.2018.08.033

Provided by University of California, Los Angeles