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For Immediate Release
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CU Researchers' Study on Cellular Process Published in Nature Communications

AURORA, Colo. (Aug. 5, 2016) – Researchers from the University of Colorado School of Medicine and the University of Geneva have explained a previously unrecognized cellular process that could help understand some causes of cancer, polycystic kidney disease and other intestinal disorders.

The process is described in an article published Aug. 3 in Nature Communications, a peer-reviewed an open access, multidisciplinary scientific journal.

Most human tissues and organs consist of various hollow structures, such as lungs and kidney tubules, that are formed by a specialized type of cells, known as epithelial cells. These cells are highly polarized at the individual cell level and are arranged in polarized tubular structures. The loss of individual cell polarity and malformation of the tubular structures, which are multicellular, leads to a variety of diseases, such as cancer, polycystic kidney disease, and other intestinal disorders.

"Unfortunately we still understand very little about the molecular machinery governing individual cell polarization and the ability of these cells to 'talk' to each other in order to coordinate the formation of these luminal structures," said Rytis Prekeris, PhD, professor of cell and developmental biology at the CU School of Medicine.

The study, published in Nature Communications, focuses on determining how, during embryonic development, individual collections of non-polarized epithelial cell precursors coordinate with each other to determine how and where to start forming lumen of these multicellular tubular structures while undergoing polarization at individual cellular level.

The researchers found that division of individual cells leaves a structure known as a midbody. Midbody is a tubulin-rich structure that forms during cell division. For many years, the midbody has been thought to play no further role after cell division is completed.

In this study, Prekeris and his fellow authors show that midbody is preserved after cell division and fulfills an important function of providing a "polarity cue" that marks the spot where future

lumen will form. While cell division is at first a symmetry-breaking event, the midbody allow the newly formed daughter cells to coordinate where future lumen will form. In addition, the researchers identified protein interaction cascades that are essential to the process.

In addition to Prekeris, the co-authors of the Nature Communications article are Anthony J. Mangan, Daniel V. Sietsema, Dongying Li, PhD, and Jeffrey K. Moore, PhD, all from the University of Colorado School of Medicine and Sandra Citi, MD, PhD, from the University of Geneva.

This study was supported by grants from the National Institutes of Health, the National Institute of Diabetes and Digestive and Kidney Diseases, the National Institute of General Medical Sciences and the Howard Hughes Medical Institute.

About the University of Colorado School of Medicine

Faculty at the University of Colorado School of Medicine work to advance science and improve care. These faculty members include physicians, educators and scientists at University of Colorado Health, Children's Hospital Colorado, Denver Health, National Jewish Health, and the Denver Veterans Affairs Medical Center. The school is located on the Anschutz Medical Campus, one of four campuses in the University of Colorado system. To learn more about the medical school's care, education, research and community engagement, visit its web site.