Connecting cilia: Cellular antennae help cells stick together

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Primary cilia are hair-like structures which protrude from almost all mammalian cells. They are thought to be sensory and involved in sampling the cell's environment. New research, published in BioMed Central's open access journal *Cilia*, launched today, shows that cilia on cells in the retina and liver are able to make stable connections with each other - indicating that cilia not only are able to sense their environment but are also involved in cell communication.

Primary cilia are structurally and functionally very similar to eukaryotic flagella (motile tails used to propel microorganisms). For many decades it was thought that cilia on human cells were primarily for movement, for example, cilia on respiratory cells drive mucous up and out of the airways by beating together, however it is now believed that they are also 'cellular antennae' - important for cell to cell communication.

In order to find out how these cilia could physically communicate Carolyn Ott and Jennifer Lippincott-Schwartz, from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, examined primary cilia from the retina, bile duct and in cultured cells. In all cases, cilia between nearby cells formed long-lasting contacts with each other, something that has never been observed before. The adhesions between cilia lasted hours or days and were dependent on interactions between glycoproteins (proteins with a sugar molecule attached).

Jennifer Lippincott-Schwartz explained, "A number of human genetic

diseases, including Bardet-Biedl syndrome, nephronophthisis, Joubert, and Meckel-Gruber syndrome, are due to defects in ciliary trafficking and signaling. Our study suggests that cilia are active transmitters and seek out neighboring cells to communicate with. These newly discovered cilia-cilia contacts may be disrupted in ciliopathies, an intriguing possibility that requires further investigation."

More information: Primary cilia utilize glycoprotein-dependent adhesion mechanisms to stabilize long-lasting cilia-cilia contacts Carolyn M Ott, Natalie Elia, Suh Young Jeong, Christine Insinna, Prabuddha Sengupta and Jennifer Lippincott-Schwartz, *Cilia* (in press)

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