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Role of Intraflagellar Transport Protein IFT20 in the Formation and Function of Motile Cilia in Mammals

Mohammad Z. Abdulghani
Wayne State University, fw2400@wayne.edu

Wei Li
Wayne State University, waylee@wayne.edu

Tao Li
Wayne State University, hr2759@wayne.edu

Michael J. Holtzman
Washington University in St. Louis, mjholtzman@wustl.edu

Gregory J. Pazour
Gregory.Pazour@umassmed.edu

See next page for additional authors

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Authors

Mohammad Z. Abdulghani, Wei Li, Tao Li, Michael J. Holtzman, Gregory J. Pazour, and Zhibing Zhang

Role of Intraflagellar Transport Protein IFT20 in the Formation and Function of Motile Cilia in Mammals

Mohammad Z. Abdulghani^{1,6}, Wei Li¹, Tao Li^{1,2}, Michael J. Holtzman³, Gregory J. Pazour⁴, Zhibing Zhang^{1,5}

1. Department of Physiology, Wayne State University, Detroit, Michigan, USA;
2. Laboratory of Animal Center, Huazhong University of Science and Technology, Wuhan, China;
3. Division of Pulmonary and Critical Care Medicine, Department of Medicine, Washington University School of Medicine, St. Louis, Missouri, United States;
4. Program in Molecular Medicine, University of Massachusetts Medical School, Worcester, Massachusetts, USA;
5. Department of Obstetrics and Gynecology, Wayne State University, Detroit, Michigan, USA;
6. Wayne State University School of Medicine, Detroit, MI, USA

Cilia are microtubular structures present on most mammalian cells, which can be categorized into motile cilia and primary cilia (non-motile cilia). The axoneme of both cilia types possess intraflagellar transport (IFT) machinery, composed of unique protein complexes that travel in opposite directions along the microtubules. Although the role of IFT in primary cilia formation has been well studied, little is known about its role in mammalian motile cilia assembly. IFT20 is a component of IFT-B complex. We generated conditional *Ift20* knockout mice by crossing floxed *Ift20* mice with the *Foxj1-Cre* transgenic mouse line to specifically delete *Ift20* from motile cilia. No difference was found in mice of all genotypes within one week after birth. However, most homozygous mutant mice presented smaller in size one week after birth, but all mice returned to normal size about 4 weeks after birth. No gross hydrocephalus was found in all the mutant mice. Analysis of a 6-week-old homozygous mutant male revealed no sperm in the cauda epididymis. Testis weight and testis/body weight was normal. However, several spermatogenesis defects were present in the testis seminiferous tubules. Given that motile cilia are also present in the epithelial cells in the brain ventricle, tracheal, efferent ductules and oviduct epithelial cells, cilia in these cells will be further examined in the homozygous mutant mice. Immunofluorescence staining using specific antibodies will be conducted; Cilia length and beat frequency (CBF) will be analyzed. TEM and SEM will be conducted to examine cilia ultrastructure. Fertility of males and females will be tested. We propose that IFT20 plays a role in motile cilia assembly and function.