A Cilium is one of the organelles found on the surface of eukaryotic cells, and centrosome is the organelle which acts as microtubule organizing center (MTOC) of animal cells and regulates the cell cycle. The formation of cilia and centrosome is organized by centrioles, which are important for cell division, polarity and motility.

Cilia are projections from cell surface and have two types: one kind is motile cilia, which exert mechano-signaling found in airway, ovary, ventricle and sperm. The other is primary cilia, non-motile cilia, which exert sensory function found in kidney, bone, inner-ear, and eye. Several studies have reported that dysfunction of primary cilia lead to many diseases such as cystic kidney disease, and disease caused by dysfunction of cilia is called Primary Ciliary Dyskinesia (PCD). Similarly, deregulation of centrosome is associated with several disease including cancer and developmental diseases. Despite the important roles of primary cilia and centrosome, little is known about their structures.

This study was performed to determine the structure of primary cilia and centrosome. To this end, we established several mutant cells which were loss of PCD related genes such as Mks1, Cep290, Ift88 and verified the structural change of mutant cells. We focused on the observation of basal body and transition zone in primary cilia, which are particularly important for protein transport into cilia. And to clarify the centrosome structure during cell division, we characterized the centrosome structure of mitosis.

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