LABORATORY OF CELL STRUCTURE

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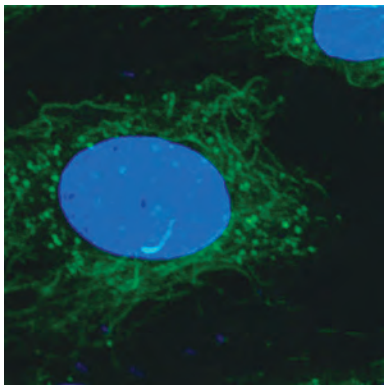
Numerous proteins localized in the cilia are linked to human diseases such as PCD (primary ciliary dyskinesia) and PCKD (polycystic kidney disease). Primary cilia are defined as single cilia that grow out of one of the centrioles during interphase in otherwise unciliated animal cells. They show a 9+0 pattern, losing a central pair of microtubules, contrasting with motile cilia with a well-known 9+2 pattern.

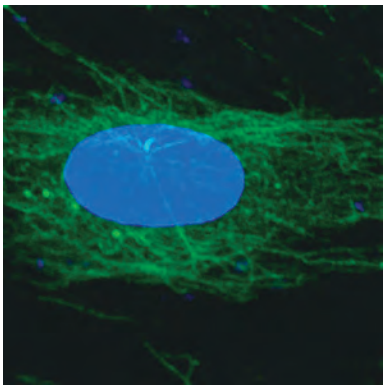
These cilia can be seen in cultured cells such as 3T3, 3T6, BHK21, NRK, and MDCK. They are quite common centriolar specializations in vivo and in vitro. The incidence of primary cilia within a cell culture is related to the degree of confluency. Examination of confluent cell monolayers showed that the primary cilia within a single preparation of a given cell line varied considerably in length. In most cases, cell lines previously used were not cloned and the results remained obscure.

Four cell lines originating from adult mouse kidneys were established in order to study the proteomics of the primary cilia. The cell lines were named nibb-K1, K4, K5, and K8. The primary cilia of the cells were observed by indirect immunofluorescence microscopy (Figure 1). In the cloned cells, each cell has a distinct length of cilium, with the K5 cell having the longest one among them (up to 10 μm).

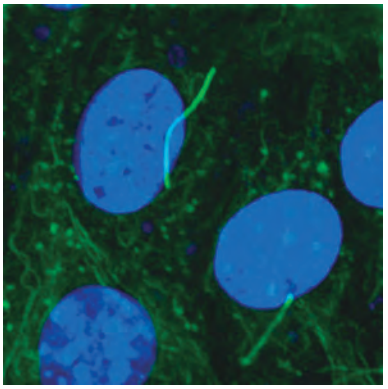
This year, we studied the relationship between primary cilia formation and one isotype of the dynein family using these cells.



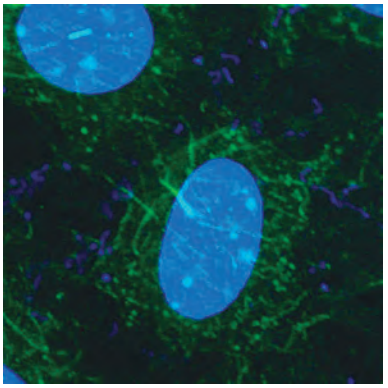
nibb-K1



nibb-K4



nibb-K5



nibb-K8

Figure 1. Typical primary cilia of four cell lines. Cells cultured on the cover slips were reacted with anti-acetylated tubulin antibody, followed by FITC-labeled secondary antibody. DNA was stained with DAPI.