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► **COVER:** 'Rotary mechanisms' by Vicky Askew, inspired by the Review on p917



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The study of normal cellular and disease physiology is inextricably linked. Disease-causing mutants can provide insight into the normal function of the affected protein and, vice versa, a cellular understanding of biological phenomena can help to explain associated disease processes.

For example, cilia are hair-like organelles that extend from the surface of almost all cell types in humans. They exert various tissue-specific functions during development, morphogenesis and homeostasis, which explains why cilia-related disorders can affect many organ systems. Manfred Fliegauf, Thomas Benzing and Heymut Omran (page 880) discuss in a Review from the Mechanisms of Disease article series (www.nature.com/nrm/series/diseasemech) how a better understanding of the components that are involved in cilia-specific functions in different tissues will help to elucidate the molecular mechanisms underlying ciliopathies. Indeed, several molecular mechanisms involved in cilia-related cystic kidney disease have been identified that can be pharmacologically targeted.

Taking another vital organelle — the mitochondrion — one might expect defects in its cellular dynamics to have equally widespread effects. However, as Scott A. Detmer and David C. Chan (page 870) explain, diseases caused by mutations in mitochondrial fusion and fission components are mostly limited to the neuronal system and involve neurodegeneration. This disease aetiology suggests that mitochondrial dynamics (including transport to specific subcellular localizations) is especially important for polarized cells with high energy demands, as is the case with neurons. So, the study of disease aetiology can teach cell biologists a thing or two about their favourite organelle, process or molecular machine. In turn, cell biologists continue to provide vital insights into disease mechanisms and therapeutic targets.

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