

## Short Biography

The molecular biologist Michael N. Hall is a dual American-Swiss citizen born in 1953 in Puerto Rico (United States). He spent his childhood years in South America (Venezuela and Peru) before moving to the United States to pursue his studies. He received his Ph.D. from Harvard University in 1981, and was a postdoctoral fellow at the Pasteur Institute (Paris, France) and the University of California, San Francisco. He joined the Biozentrum of the University of Basel (Switzerland) in 1987 where he is currently Professor and former Chair of Biochemistry. Dr. Hall has received numerous awards, including the Cloëtta Prize for Biomedical Research (2003) and the Louis-Jeantet Prize for Medicine (2009), and has served on several editorial and scientific advisory boards.

## Research

The cell is the unit of life, whether an organism consists of a single cell or, as in the case of humans, 10 trillion cells. The most fundamental features of cell behavior, indeed of life itself, are growth and division. Whereas the regulation of cell division has been studied for many years and is relatively well understood, the elucidation of mechanisms that regulate cell growth has been more recent. What are the mechanisms that mediate and integrate the many parameters of cell growth? In other words, what determines that a cell grows only at the right time and at the right place to give rise to an organ or organism? Work in the last two decades has revealed that growth is regulated by the protein kinase TOR (Target of Rapamycin, mTOR in mammals).

Dr. Hall is a world leader in the fields of TOR signaling and cell growth control. In 1991, Hall and colleagues discovered TOR and subsequently elucidated its role as a central controller of cell growth and metabolism. TOR is a conserved, nutrient-, energy- and insulin-activated protein kinase. The discovery of TOR led to a fundamental change in how one thinks of cell growth. It is not a spontaneous process that just happens when building blocks (nutrients) are available, but rather a highly regulated, plastic process controlled by TOR-dependent signaling pathways. The Hall group also discovered the two TOR complexes TORC1 and TORC2, and originally described the two signaling branches mediated by these two complexes. The two TOR complexes, like TOR itself, are conserved from unicellular fungi to human. Thus, the two TOR complexes constitute an ancestral signaling network conserved throughout eukaryotic evolution to control the fundamental process of cell growth. As a central controller of cell growth and metabolism, TOR plays a key role in development and aging, and is implicated in disorders such as cancer, cardiovascular disease, diabetes, and obesity. The identification of TOR has led to promising therapeutic strategies in the treatment of these disorders.