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Endocytosis and stress: From mechanisms to cellular physiology

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Editorial: Endocytosis and stress. From mechanisms to cellular physiology.

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This issue presents a series of articles and reviews on the theme "Endocytosis and stress". The purpose of this issue was to cover various aspects of the functions of endocytosis, but also in a variety of model organisms to highlight how this conserved process has been exploited throughout evolution.

A series of reviews highlight connections between endocytosis and the properties of the extracellular environment, including signaling molecules, nutrient availability, or biophysical constraints, as well as the importance of endocytosis in cellular function, adaptation, and pathologies. The plethora of cellular functions regulated by endocytosis is well discussed by Giangreco et al. (1) who provide a series of examples illustrating the various functions of endocytic proteins in cellular physiology, and the pathologies derived from their malfunction. This includes the role of adaptor proteins in clathrin-mediated endocytosis (CME) and non-clathrin-mediated endocytosis (NCE), how this regulates signaling pathways, and the links with tumorigenesis. Two reviews then detail the connections between endocytosis and the regulation of signaling pathways. Wu, Chiang et al. (2) focus on the mechanisms by which Wnt signaling, a key pathway in development and morphogenesis in animals, is regulated by endocytosis and endosomal trafficking. They notably highlight work in *C. elegans* on the involvement in Wnt signaling and stress response. Seib & Klein (3) then discuss the role of endocytosis in the activation of Notch signaling. They mention the importance of endocytosis in generating pulling forces leading to Notch cleavage, a crucial step in Notch pathway activation, but also additional functions in the recycling of Notch ligands.

The interplay between membrane tension and clathrin-mediated endocytosis is carefully reviewed by Djakbarova et al. (4). The importance of membrane tension in physiological processes such as cell division, migration, or spreading is also underscored. In their monograph, the authors detail how membrane tension is established, regulated and how this regulates clathrin-mediated endocytosis.

Two additional reviews focus on the regulation of nutrient transporters by endocytosis. Ivanov and Vert (5) describe the exquisite molecular mechanisms by which metal transporters are regulated in plants and emphasize similarities and differences with other model systems. Kahlhofer et al. (6) focus on the regulation of nutrient transporter endocytosis by metabolism, and the importance of arrestin-related proteins in this process in fungal and animal cells. Both reviews highlight the importance of endocytosis in response to nutrient challenges.

This issue also includes several research articles. Foissner et al. (7) describe the effect of the drug Brefeldin A on endocytosis in the fascinating green algae *Chara australis*. The role of Brefeldin A on the endocytosis and polar distribution of the *Arabidopsis* borate exporter BOR1 is examined by Yoshinari et al. (8), who show a role for the ARF-GEF GNOM1 in this process. Buelto et al. (9) study the mechanism of endocytosis in glucose-starved *Saccharomyces cerevisiae* and demonstrate a role for the trans-Golgi network and clathrin adaptors in the endocytosis of nutrient transporters under these conditions. Finally, the article by Robinson et al. (10) describes the trafficking of the yeast glycerophosphoinositol transporter Git1 and how its endocytosis via the arrestin-like proteins Aly1/2 impacts on sphingolipid homeostasis.

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