Contents

RESOURCE

iBiology: communicating the process of science
S. S. Goodwin 2217–2219

ARTICLES

Biosynthesis and Biodegradation

OS-9 facilitates turnover of nonnative GRP94 marked by hyperglycosylation
D. Dersh, S. M. Jones, D. Eletto, J. C. Christianson, and Y. Argon 2220–2234
ER quality control factors GRP94 and OS-9 associate not for the disposal of ERAD substrates but instead because OS-9 sequesters and degrades aberrant forms of GRP94, which are hyperglycosylated at cryptic acceptor sites and have altered structure and activity. This highlights a novel mechanism of quality control of an ER-resident chaperone.

Cell Biology of Disease

Genome-wide analysis of Saccharomyces cerevisiae identifies cellular processes affecting intracellular aggregation of Alzheimer’s amyloid-β42: importance of lipid homeostasis
Aggregation of intracellular amyloid-β (Aβ) is an early event in Alzheimer’s disease. Here Aβ42 fused to GFP was expressed in each mutant of a Saccharomyces cerevisiae genome-wide deletion library to identify cellular processes affecting intracellular Aβ42 aggregation by assessing fluorescence of the Aβ42-GFP fusion.

Cell Cycle

A Highlights from MBoC Selection

Cdk1 promotes cytokinesis in fission yeast through activation of the septation initiation network
Although Cdk1 inhibits cytokinesis, it is shown that Cdk1 promotes an initial step by phosphorylating and promoting Byr4 removal from spindle pole bodies in metaphase. Because Byr4 inhibits the septation initiation network (SIN), Cdk1 helps prime the onset of cytokinesis by promoting the development of SIN asymmetry in concert with Plo1 kinase.

Cell Physiology

A Highlights from MBoC Selection

HSP70-binding protein HSPBP1 regulates chaperone expression at a posttranslational level and is essential for spermatogenesis
The cochaperone HSPBP1 controls chaperone expression at a posttranslational level by inhibiting the ubiquitylation and proteasomal degradation of inducible HSP70 proteins. This ensures the survival of spermatocytes, which are—similar to tumor cells—dependent on high-level chaperone expression.

Cytoskeleton

A Highlights from MBoC Selection

Kinetochore–microtubule attachment throughout mitosis potentiated by the elongated stalk of the kinetochore kinesin CENP-E
CENP-E kinesin harvests a highly elongated coiled-coil stalk. Using in vitro and in vivo approaches, we characterize a “Bonsai” version of CENP-E with a shortened stalk. We show that the stalk positively regulates CENP-E’s motor activity, which is required for maintenance of kinetochore–microtubule attachments in both metaphase and anaphase.
Common regulatory control of CTP synthase enzyme activity and filament formation
C. Noree, E. Monfort, A. K. Shiau, and J. E. Wilhelm
CTP synthase is one of many enzymes that form novel intracellular filaments/structures. A structure–function approach is used to show that the same regulatory sites that control CTP synthase enzyme activity also control filament formation. Close coupling of assembly to enzyme regulation is proposed to be a general feature of these structures.

Signaling
Role of TGF-β receptor III localization in polarity and breast cancer progression
TβRIII is basolaterally localized in polarized breast epithelial cells. The disruption of TβRIII targeting by mutation of proline 826 results in global loss of cell polarity through enhanced EMT. The mistargeting of TβRIII results in enhanced proliferation, migration, and invasion in vitro and enhanced tumor formation and invasion in vivo.

A Highlights from MBoC Selection
Subcellular optogenetic inhibition of G proteins generates signaling gradients and cell migration
P. R. O’Neill and N. Gautam
New optogenetic tools are introduced that provide spatial and temporal control over the activity of heterotrimeric G protein subunits inside single cells. They are used to identify dynamic roles for G protein subunits in immune cell migration. They can be applied to study the mechanistic basis of other GPCR-regulated cellular functions.