

## Editorial

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Exploring cellular structure and function was the heading of the 12th International Congress of Cell Biology (ICCB) held on 21–25 July 2016 in Prague, Czech Republic. Exploring cellular structure and function is the key role of Cell Biology. It will lead us to a deeper understanding of tissues, organs, and organisms made of these cells. Understanding cellular structure and function is of ever greater importance in modern medicine. This issue of PROTOPLASMA brings together a series of reviews that are committed to this goal.

Elucidation of cellular structures is almost synonymous with technological progress in microscopy. On their “journey through the microscopic ages of DNA replication” Marius Reinhart and Christina Cardoso use their review on DNA replication and its intranuclear organization for a journey through the history of microscopy from “water-filled glass bowls” to super resolution microscopy (Reinhart and Cardoso, 2017). Eva Bártořová and colleagues review the role of HP1 proteins in DNA damage repair. Their review uncovers the many unsolved questions in this field (Bártořová et al., 2017). Enormous diversity of the mammalian proteome is caused by the ability of a single gene locus to encode multiple protein isoforms. One of the mechanisms involved in creating this proteome complexity is alternative promoter usage. Tomas Vacik and Ivan Raska review

involvement of alternative intronic promoters in development and disease (Vacik and Raska, 2017). The critical importance of the spatio-temporal organization of eukaryotic cells is discussed in the review by Pavel Dráber and colleagues on the regulation of microtubule nucleation mediated by  $\gamma$ -tubulin complexes (Sulimenko et al., 2017). Basic building components of microtubules,  $\alpha$ - and  $\beta$ -tubulin subunits, exist in multiple isotypes. Among them, the  $\beta$ III isotype is overexpressed in many aggressive cancers. Richard Ludueña and colleagues in their contribution bring attention to a novel mechanism by which cancer cells may undergo adaptive mutational changes involving alternate  $\beta$ -tubulin isotypes to make them acquire some of the pro-survival properties of  $\beta$ III-tubulin (Wang et al., 2017). Similarly to other types of tumors, human malignant melanoma represents a complicated ecosystem, where keratinocytes, melanoma cancer-associated fibroblasts, and infiltrating leukocytes communicate with the melanoma cells. Possible strategies to modify the intercellular crosstalk in melanoma that can be employed for therapeutic purposes are discussed in the review by Karel Smetana and colleagues (Dvořánková et al., 2017).

Various aspects of cell shape and cell polarity are covered by the contributions of Tomas Vomastek on the assembly and function of perinuclear actin cap in migrating cells (Maninova et al., 2017) and in the review about the crosstalk of cell polarity and signaling pathways by Tomáš Mazel (Mazel, 2017). Glucocorticoids are of utmost medical importance because of their pleiotropic physiological function. Signaling of glucocorticoids through their respective receptors has been instrumental for studying transcriptional regulation. Ivana Grbesa and Ofir Hakim focus in their review on “Genomic effects of glucocorticoids” on recent developments in chromatin accessibility, chromatin remodeling, and 3D chromatin structure (Grbesa and Hakim, 2017). Obesity is a major risk factor for the development of comorbidities such as type 2 diabetes mellitus, cardiovascular diseases, or several types of cancer. It is

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accompanied by the development of chronic low-grade inflammation in adipose tissue. Martin Haluzík and colleagues focused their review (Cinkajzlová et al., 2017) on macrophages and lymphocytes and their possible role in low-grade inflammation in fat.

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