Annual Review of Cell and Developmental Biology, 2020. Ruth Lehmann, Jennifer Lippincott-Schwartz and Alexander F. Schier (eds). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, California, 94303-0139, USA. Vol. 36. x + 577 pp. Price: US$ 118.00.

The volume 36 of the *Annual Review of Cell and Developmental Biology* (*ARCDB*) was compiled during the COVID-19 pandemic. However, the reviews were solicited before the pandemic began and therefore the contents do not reflect the biology related to COVID-19. One of the editors, Ruth Lehmann gratefully acknowledges the team. In the Foreword, Lehman does allude to the catastrophic effects of the COVID-19 pandemic and the lack of a basic understanding of the disease at various levels, including its origins. I am sure subsequent volumes will have reviews on the biology of the disease. Another aspect that is new is free availability of *Annual Reviews* henceforth.

As in the past volumes, areas in cell and developmental biology are covered without any particular theme. There has been increasing appreciation of the interface between physics and structural biology in cell and developmental biology, and this is reflected in the reviews in this volume. Cell and developmental biology over the years has had extensive inputs from protein biochemistry, molecular biology and bioenergetics apart from structural biology. This aspect is reflected in several reviews.

The review by Osman and Cramer describes in detail, the structures of RNA polymerase II complex, drawing inference from the crystal/cryo-EM structures. The title 'Structural biology of RNA polymerase II transcription: 20 years on' conveys the essence of the review. A table summarizing the structures along with their Protein Data Bank ids will be useful to researchers who would like to examine them in detail. In several earlier reviews in *ARCDB*, how physics plays a major role in developmental biology has been highlighted. The review by Franze is along these lines. Entitled 'Integrated chemistry and mechanics: the forces driving axon growth', the review describes, with excellent illustrations, the link between chemical signals and forces that regulate axon growth. Another review by Hamant and Saunders provides insight into how physics principles play a role in shaping organs in animals and plants, not just molecular and cellular events. All the three reviews have excellent illustrations that would help the uninitiated. Structural biology in a broad sense is evident in the review by Kadzik *et al*. entitled 'F-actin cytoskeleton network self-organization through competition and cooperation'. They highlight how self-organization of F-actin and dynamics are crucial in cellular events. There are only two figures and one supplemental figure in the review. While the authors refer to these figures throughout the review, more figures would have been helpful in appreciating the roles of F-actin networks.

Five reviews discuss cell biology aspects of various diseases. The review by Mallucci *et al*. is in the area of neurodegenerative disorder. How insights into protein aggregation can help in developing therapies is discussed, as indicated in the title 'Developing therapies for neurodegenerative disorders. Insights from protein aggregation and cellular stress response'. Parkinson's disease is the subject of review by Singh and Muqit. They discuss how aberrant vesicle trafficking in cells has an important role. The contents are summarized well in figures 2–4, which are essentially like 'table of contents'. Lu-Culligan and Iwasaki in their review 'The role of immune factors in shaping fetal neurodevelopment', provide a good overview of disease association such as autism, spectrum disorder neural tube defects, cerebral palsy and childhood epilepsy. The authors argue for studies on molecular aspects to understand the disease better. The review by Logan *et al.* entitled 'Pediatric allergy and oral tolerance' addresses several aspects of allergy such as eczema, asthma, allergic rhinitis and the serious problem of food allergy. The review is, however, descriptive and immunological mechanisms are discussed only briefly. The review entitled 'B cell immunosenescence' by Frasca *et al*. discusses various aspects of immune ageing. Of particular interest are the sections where decrease of antibody response in the aged and decrease in antibody responses to vaccines in the aged are discussed. Subsections are devoted to responses to influenza and respiratory syncytial vaccines that would be of interest to those working on vaccines against SARS-CoV-2.

Reconstitution in cell biology has provided crucial insights into protein secretion from cells and sorting to various locations in them. Sorting of proteins has been the subject of several reviews in *ARCDB*. The review by Schlissel and Li entitled 'Synthetic developmental biology: understanding through reconstitution' describes how reconstitution methods with possibly minimal components can be used to study cell-fate decision, population size control and spatial pattern formation. The review indicates that reconstitution can provide important cues in developmental biology too.

Aspects of subcellular structures and organelles, stem cells, and gene expression studies in cell and developmental biology are discussed in several reviews, as in the previous volumes. They are not updates and cover new perspectives. The areas reviewed are: nuclear membrane with emphasis on rupture and its consequences (Maciejowski and Hatch), lipid droplets with a focus on the proteome and ubiquitin-dependent and autophagy lipid droplet proteins degradation (Roberts and Olzmann), neutrophil extracellular traps or NETosis (Thiam *et al*.), organelle size scaling describing subcellular scaling and its functional consequences (Marshall), and a comprehensive review on mitochondrial quality control and restraining innate immunity (Moehlman and Youle). The review by Moehlman and Youle describes how the use of model systems such as *Drosophila* and *C. elegans* have provided insights and links between mitochondrial dysfunction and disease. Cellular, and molecular and physiological adaptions of hibernation (Mohr *et al*.) emphasize that hibernation involves active processes with regulation at molecular, cellular and organismal levels. The review of human embryogenesis (Gerri *et al*.) indicates how advances in molecular techniques, single cell analysis and genome editing makes it possible to study human embryogenesis directly. Native hematopoiesis with emphasis on application of genetic lineage tracing in mice is reviewed by Pucella *et al*. Sehgal *et al*. highlight how cellular approaches give clues to circadian and non-classical clock influences on development.

The importance of proteins involved in bioenergetics, metabolism and signalling is the focus in two reviews. Wang and Walter review 'Msp1/TAAD in protein quality control and regulation of synaptic activities', where the role of ATPase family of AAA domain containing is highlighted. The review by Koseska and Bastiaens is on 'Processing temporal patterns by an epidermal growth factor receptor network dynamically established in space'. The authors suggest that microspectroscopic

imaging approaches spatially resolve signalling reactions in living cells along with microfluidic devices. The review by Lacchini and Goossens is on specialized plant metabolism with emphasis on combinatorial control.

The organization of reviews into different areas of biology is by the present author. Most but not all of the reviews have excellent illustrations which essentially summarize their contents. Since online access will be possible, supplementary information is part of many reviews. In my opinion, the matter in the supplementary information could be part of the main text as hard-copy readers would be handicapped.

A phenomenal number of publications on various aspects of SARS-CoV-2 biology, including origin of the virus has appeared since the COVID-19 pandemic began. Though only a little more than a year old, SARS-Cov-2 and COVID-19 are likely to be topics of review in the coming issues of *ARCDB* and other volumes in the series.

R. NAGARAJ

CSIR-Centre for Cellular and Molecular Biology,
Uppal Road,
Hyderabad 500 007, India
e-mail: nraj@ccmb.res.in