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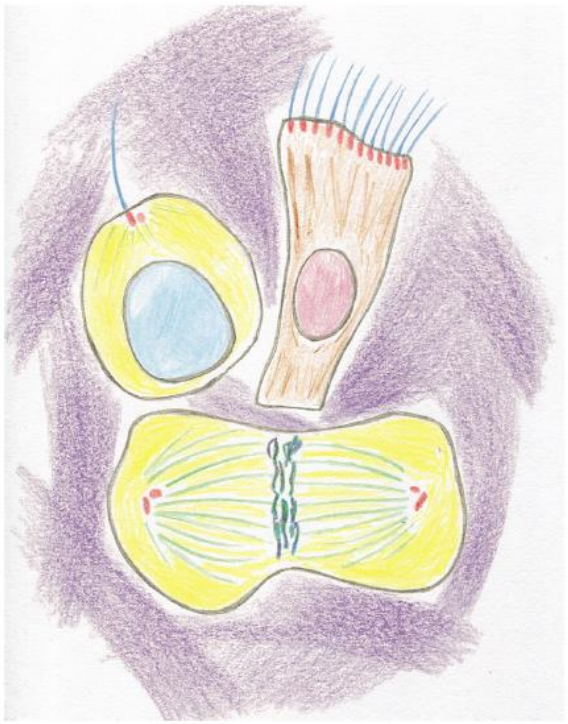
CILIA AND CENTROSOMES IN DEVELOPMENT, PHYSIOLOGY AND DISEASE

Guest Editor: **SUDIPTO ROY**



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Legend for the cover.
Colour pencil and crayon drawing of the primary cilium, motile cilia and centrosomes by Sudipto Roy.

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Editorial

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Cilia and centrosomes in the spotlight

It is generally accepted that the first description of cilia and flagella is to be found in the records of Antonie van Leeuwenhoek, a 17th century Dutch businessman and microscope maker, who was enthralled to see the "incredibly thin feet, or little legs, which were moved very nimbly" on protozoans that he observed with the microscopes he built. Centrosomes, which typically consist of a pair of centrioles, were discovered later, in the 1880 s, by Theodore Boveri and Van Beneden. While the important function of centrosomes in cell division was appreciated quickly and investigated with much fervour, exploration of the biology of cilia and flagella was relegated to a much more exclusive group of investigators, mainly involved in studying mechanisms of ciliary motility or sensory functions like vision and olfaction. Even though the fact that most cells in vertebrates elaborate a solitary and immotile cilium, the primary cilium, was appreciated by cell biologists for decades, it was not until genetic analyses linked it to important signalling pathways like Hedgehog and Wnt and human diseases like polycystic kidney disease that this once-regarded vestigial organelle became the focal point of research of a thriving community of scientists.

In this special issue of Seminars in Cell and Developmental Biology, we celebrate cilia and centrosomes by featuring an eclectic collection of 13 thematic articles that focus largely on their roles in mammalian development and physiology and how their dysfunction leads to a wide spectrum of human diseases. These range from the more conventional yet intensely worked upon areas like cilia, Hedgehog signalling and polycystic kidney disorder, more recently evolving topics like cilia and obesity to the completely novel avenue of cilia and spine morphogenesis. The lead authors, drawn from all across the world, are experts in their respective areas of research: some of them are senior or mid-career investigators with a long legacy of seminal contributions to the field of cilia and centrosome research. These include Cecilia Low (cilia and heart disease), Dominic Norris (cilia and left-right asymmetry), Hannah Mitchison (cilia and airway disease), Tamara Caspary (cilia and neural development), Nic Berbari (cilia and obesity), Travis Stracker (making multiciliated cells), Takuji Ishikawa (ultrastructure of cilia and centrosomes), Anand Swaroop (cilia and retinal disease) and Saikat Mukhopadhyay (ciliary Hedgehog signalling). Others have relatively recently morphed into independent scientists, and despite the responsibilities that come with starting and running a fledgling lab, they have graciously contributed articles for this issue. Daniel Grimes (cilia and spine morphogenesis), Priyanka Singh (centrosome defects in human disease), Swadhin Jana (centrosome biology), Daniel Kopinke (cilia and Hedgehog signalling) and Ming Ma (cilia and polycystic kidney disease) are these new kids on the block! I am grateful to all of them and their co-author colleagues for their contributions, especially in these challenging times of the Covid-19 outbreak in which they had to work to deliver their manuscripts on schedule. I am also indebted to all the referees, whose insightful comments and criticisms, helped to significantly improve the final quality of all the articles.

Lastly, I would like to thank John Davey for asking me to serve as the guest editor for this special issue and for his enthusiasm throughout the production process. This opportunity allowed me to gather a considerable amount of new information on cilia and centrosomes, of which I was completely unaware. Thanks are also due to the editorial staff, Mujahida Aafreen and Hamie D'silva, for patiently assisting the authors and me with the online submission, reviewing and editing processes.

I hope that this volume will be of benefit not only to basic researchers keen to discover new aspects of cilia and centrosome biology, but also for clinically-oriented scientists as well as physicians directly dealing with patients afflicted with diseases arising from abnormalities in these organelles.

Acknowledgements

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