

of these concepts. Priyadarshini Chidambaram in a chapter on gender-based inequities highlights how available research has largely dealt with sex as a biological identity and only marginally with gender as a social construct. She further clarifies the dynamic nature of gender construct, and differences between concepts of gender identity and gender expression. These chapters not only synthesize the available evidence, but also provide its critique. While they highlight stark inequities along these axes, as someone familiar with the field would envisage, they bring out nuanced understanding of intersectional nature of vulnerabilities that are experienced differentially within and over time in a given category of people.

Chapter 8 by Rakhal Gaitonde breaks the monotony set by earlier chapters by focusing on an institutional determinant: how health systems have impacted health inequities in India. On the whole, the available evidence implies that health systems have not specifically responded to those most marginalized in society. This chapter is relevant, as India has initiated ambitious reforms in the health sector to achieve universal health coverage: how do we address the inequity-causing mechanisms outlined by this chapter to transform health systems into enabling institutions?

The last chapter, authored collectively by editors and chapter contributors, summarizes the major findings and limitations of health inequities research in India. Reiterating their emphasis on the need for better theorization, they reproduce an epistemological framework to envisage pathways or mechanisms explaining health inequities. Adapting from the earlier works and interpretations, they highlight three types of mechanisms: (1) type-1 or situational mechanisms operating at the macro (broader societal and institutional) level and impacting the micro (household, individuals) level; (2) type-2 or action-formation mechanisms operating at the micro level across individuals and within communities and households and (3) type-3 or transformational mechanisms explaining how individual actions within communities (micro level) emancipate change in broader macro-level factors. The authors prefer this way of conceptualizing mechanisms underlying health inequities as it acknowledges the role of both the structure and the agency, as well as the

presence of multiple interacting mechanisms at different levels. They further clarify using micro- and macro-levels as mere placeholders for mechanisms operating at several hierarchical levels (from global to local), and not to refer to any two specific levels.

Interestingly, the authors claim (in the very title of this chapter) that promoting a body of coherent and appropriate health inequity research is not merely a function of promoting better knowledge and skills. It is rather a 'political project'. Given the potential of health inequities research to uncover pathways of inequity and to influence decisions with regard to public policies, researchers have a crucial role in the struggle to achieve a just society. Towards this end, they highlight the need to reform the ways we currently fund and govern health research. In this context, the only major concern I have regarding this book is that it is exceedingly costly, pointing to one of the very structural barriers that underlie the authors' plea for a political project. I would have also appreciated more examples from the global literature of how some of the advanced and more appropriate theoretical frameworks mentioned by the authors have been used to research health inequities. May be a chapter of its own would have balanced an overwhelmingly grim and somewhat predicted picture that emerges from the entire exercise.

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These are exciting and dangerous times for genetics. As we make major advances in understanding the genetic basis of

several complex brain disorders^{1,2} and other diseases, the attempts to rationalize 'intelligence'³ and 'educational attainment'⁴ as inherent genetic traits, even possibly under natural selection^{5,6}, bother us.

It is at this juncture that the current volume of *Annual Reviews of Genetics* has appeared. As always, the topics reviewed are a judicious mix of the tradition and the cutting edge. The opening article by Ralph Bock reviews the experimental systems developed to understand the endosymbiotic origin of mitochondria and chloroplasts from free-living bacteria, and the insights it has brought about organellar diversity and horizontal genome transfer. How the universal genetic code (UGC) originated and evolved is a pressing question in evolutionary biology. Koonin and Novozhilov in their illuminating review argue that the high fidelity of amino acid recognition by the proto-tRNAs preceded the expansion of amino acids. In their review of the genetics of social behaviour in insects, Weitekamp *et al.* criticize the limitations of the current experimental and theoretical approaches in this field. They suggest inclusion of more replicates and propose methodological paradigm shifts such as taking indirect genetic effects (IGEs) into account in experiments and analysis for a better understanding of eusociality. The evolution of nervous system has been and still is one of the most elusive enigmas in science. Varoqueaux and Fasshauer taking evidence from comparative genomics show that several simple animals such as poriferans, who are devoid of any nerve cells, share the same basic set of genes as animals with more complex nervous system, suggesting that simple neurosecretory cells may have given rise to neuronal networks and a complex nervous system.

A major goal of genetic and genomic research is to understand the genetic basis of diseases and endeavour for the amelioration of such ailments. Lim *et al.* review the different kinds of mosaicism observed in humans, with particular reference to mosaicism observed in skin, and how such mutations help in understanding biological pathways and possible treatments. We often imagine infections to be largely environmental and that the host genomic variation has little to do with it. Using evidence from genome-wide association studies and viral infection in humans, Kenney *et al.*

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mention that there are scores of human genes that have been shown to be associated with particular viral infections. The relationship between human genome and microbiome is a thrust area of current biomedical research. Goodrich *et al.* review the host loci that have been found to be associated with microbial diversity. They suggest microbiome as a complex trait, and emphasize its inclusion along with genetics and environment for proper understanding of a disease. The itch sensation was once thought to be transmitted by neurons responsible for pain sensation. Meixiong and Dong review how recent studies have revealed itch to be transmitted by dedicated neurons via mass-related G-protein coupled receptors. *Drosophila* is an ideal system for understanding the nervous system. Perry *et al.* review our current understanding of *Drosophila* vision. They describe the anatomy of its visual system, its physiology as well as the molecular mechanism of vision.

Yeast is one of the favourite systems of geneticists. Two of the reviews in this volume deal with advances in genetics made using this model system. Ken-ichi Noma emphasizes the hierarchical order in which the three-dimensional genome of yeast is organized. The importance of cohesins and condensins in the entire process is highlighted. Towards the other end, Cavanaugh and Jaspersen discuss the inter-relationship among centrosomes, spindle pole bodies and nuclear envelope taking knowledge primarily from yeasts, but comparing it with humans. They provide a detailed description of the processes, and emphasize how several components in these different processes are the same.

Many poripherans and amphibians can regenerate themselves. Understanding the genetic mechanism of regeneration can undoubtedly advance medicine. Chen and Poss discuss how work with the zebra fish and salamander involving molecular genetics, modern imaging technologies and a quantitative approach has advanced our understanding of regeneration genetics. The current paradigm entails not to look at individual genes in isolation, but treat them as part of a bigger network. Martinez-Pastor *et al.* taking the Archaea as their system, review our current knowledge about gene regulatory networks. They discuss the resilience of such networks to environmental perturbations as well as how cur-

rent knowledge allows us to predict changes to the network corresponding to particular perturbations. Christine Mayr discusses the 3'-untranslated (3'-UTR) regions of messenger RNAs (mRNAs). The longer 3'-UTRs in humans compared to yeasts not only can act as regulatory RNAs or small RNAs, but also as operons. The players in these processes are also discussed. Non-coding RNAs are also the topic of the review by Leonie Ringrose. She discusses the role of these RNAs in Polycomb and Trithorax epigenetic gene regulatory systems, and reviews the current theoretical literature.

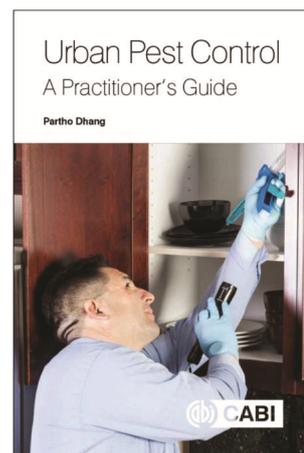
Three of the reviews in this volume deal with plants. Ruonala *et al.* emphasize the importance of coordinated gene expression in different parts of a plant in the development of vascular system. They detail the major players in the process and the gene networks responsible for the differentiation of different cell types in this system. Wheat is a classic example. Uauy *et al.* discuss how a combination of induced mutations and high throughput genome sequencing is helping geneticists understand genetic variation in polyploid wheat.

For most of us who work on a very small aspect of genetic research, the diversity of topics is bewildering to say the least. At the same time as geneticists and scientists, we must acknowledge the responsibility for the implications of our research. We must be wary to present our work with adequate caveats and not overplay the inferences. Unfortunately, the present scientific culture, where the 'sellability' of research is paramount, caution would just bring one 'defeat'.

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Urban Pest Control: A Practitioner's Guide. Partho Dhang. CAB International, CABI, Nosworthy Way, Wallingford, Oxfordshire OX10 8DE, UK. 2018. 138 pp. Price: Rs 2100; US\$ 32.99. ISBN: 9781786395146

This book provides the opportunity for an alternative career option for entomology graduates from agriculture to household pests. Indian universities have been producing countless agriculture graduates with entomology as a major or an ancillary subject. Most of them look for opportunities to work in fields related to agriculture or chemical industry. This book opens up avenues to take the subject of entomology as an entrepreneurial venture, similar to what its author has done.

The book is the first of its kind in this subject with quality colour photographs, illustrations and easy-to-compare tabulated information for quick reference. This is a strength of the book in addition to a large amount of handy information, written following a non-technical script. The book is a useful self-learning tool for start-ups as well as for training fellow practitioners. It contains simplified pest identification keys, a vital tool for field technicians to use on their job. In addition to its core contents covering common urban pests, the book also includes a fair number of related topics in pest control such as methodologies used, latest formulation in use, information on pesticide handling and tips on rational marketing. Overall, it serves as a complete guide to existing practitioners.

The book opens with a valuable first chapter titled 'Understanding the business of controlling pests'. This chapter sends out the most important message