are established through repetitive physical exercises focusing on specific parts of the body (stylized actions, movements, postures and rhythmic dance steps) that progressively develop in intensity and complexity. The aim is to inscribe aesthetic, emotive, thematic and other aspects of performance in the student and train the body to perform without the involvement of the conscious mind. There is seldom any attempt to pass on knowledge of a conceptual nature to the trainee. Rise in the mental awareness of the student enhances the quality of performance. Narayanan also examines the societal contexts in which the teaching practices of Kathakali developed, drawing a parallel with the training of the martial art *Kalalaripayattu*. He suggests that the culture of training during 17th and 18th centuries, the period when pedagogy evolved in *Kathakali and in Kalaris*, was to create an embedded knowledge that can be elicited at will and without resorting to 'conscious' intervention of the mind.

Naresh Keerthi discusses the concept and implications of *Prabandha*, which as a category meant several things to musicologists from Matanga (8th century AD) to Venkatamakhin (16th century AD). Various examples of *Prabandha* songs are found in musicological sources from the late medieval period. Keerthi traces the history of *Prabandha* in musicology literature and examines the geneology, theory and practice of *Sriranga Prabandha*, a specific sub-type of the genre. He opines that 'reading musical composition and genres as historical–cultural artifacts makes them amenable to very different analyses'. He also debates on how the mix of textual and performative features in musical *Prabandhas* made them, in comparison to literature more understandable to a larger audience.

Architectural practices in India date back to the Indus valley civilization (c. 300 BC). Monuments at various locations affirm the astonishing level of perfections achieved by designers, masons, craftsmen and artisans of early India. R. V. Achari distinguishes *Vastuvidya* (architecture) from *Vastusastra* (sociocultural norms of building construction) and documents the textual tradition, principal features and transitions in *Vastusatra* and the modern reinventions. Achari portrays *Vastuvidya* as a modern incarnation of *Vastusastra*. He concludes that 'the historical monuments are enduring testimonies to the *Vastuvidya* knowledge of our past masters'.

In summary, the articles in this collection reveal that traditional Indian intellectual pursuits were not 'simply magical, romantic, speculative and dogmatic'. The reviews in various domains of knowledge systems suggest a genuine scientific approach in which both inductive and deductive approaches were abundantly followed. The interesting, informative and illuminating contents of this Special Issue of *IJHS* would benefit both students and scholars from a broad range of disciplines. I recommend the study of this collection to all those who are curious to know whether ancient Indian masters possessed logic and reason.

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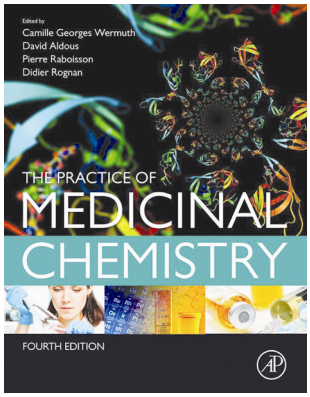

The Practice of Medicinal Chemistry. Camille Georges Wermuth, David Aldous, Pierre Raboisson and Didier Rognan (eds). Academic Press, An Imprint of Elsevier, 125, London Wall, EC2Y 5AS, UK. 2015. 4th edn. xxii + 880 pages. Price: US$ 150.00.

The book *The Practice of Medicinal Chemistry* is in the fourth edition which highlights the importance of the topic and its relevance. The book has been rightfully called as 'bible of medicinal chemistry'. It has been reviewed and recommended since the first edition in 1996.

The book has been divided in seven major areas which contain relevant subtopics. The main topics cover areas such as general aspects of medicinal chemistry, lead compound discovery strategies, structure–activity relationships, substitutions and functions, molecular modelling, pharmacokinetics and formulations. Each sub-chapter has detailed definitions and explanations of different concepts. The editors have given the responsibility of each area to experts in the field, for example the sub-chapter on natural products as pharmaceuticals and sources for lead structures is written by David J. Newman who publishes review on natural products and their role on pharmaceuticals regularly. This has helped in bringing in the required depth to the chapter.

The book describes in detail, various aspects of medicinal chemistry. Target identification, strategies for new lead compounds, in silico screening, fragment based drug discovery, structural changes to improve the inherent properties of the chosen molecule, pharmacophore identification, drug transport mechanism, formulations and nomenclature are the important topics covered. Ample illustrations help understand the concepts described in the book.

This book is recommended for the practitioners of medicinal chemistry, scientists involved in drug discovery, colleges and universities which teach medicinal chemistry in their curriculum.

The book has a minor limitation. As the chapters are written by different individuals, the drawings that are included are not uniform and the authors will hopefully overcome this in the next edition.

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Annual Review of Nutrition, 2016. Patrick J. Stover (ed.). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, California 94303-0139, USA. Vol. 36. x + 693 pages. Price: US$ 96.

It is common knowledge that dietary practices across economies, geographies and ethnicities need to be considerably modified in order to stem the increasing crisis of malnutrition at both ends of the spectrum. While at one end the number

of obese and overweight people continues to be on the rise, undernutrition and its associated issues, such as stunting/wasting in children still plague many countries (NCD Risk Factor Collaboration). Population health interventions have been initiated in many countries; however, monitoring these programmes has always been a challenge. The article on e- and m-health communication technologies by Olsen is a timely one on the use of new technologies, especially web-based and mobile apps for monitoring nutrition education programmes. Web-based interventions have proved to be effective in behavioural outcomes such as quitting smoking and reducing alcohol intake; however, their use in modifying dietary habits is still in its infancy. Considering the increasing reach of mobile/smartphones globally, it might be a useful tool in tackling not just the issues of overnutrition, but also in populations where undernutrition is a bigger problem.

A continuing thread from the last two issues of the *Annual Review of Nutrition* (*ARN*) is the topic of obesity – the problems associated with obesity, and ways to tackle it. This volume takes up another aspect of obesity, viz. appetite, and the numerous factors controlling it. Over the years, different nutrients have been held responsible for overeating behaviours, resulting in different diet regimens – low calorie, low fat, low carbohydrate, high protein, etc. Meta analyses of these diets suggest that they all have similar short- as well as long-term benefits, and in all cases the benefits are not substantial[1,2]. In this line, Carreiro *et al*. review the role of macronutrients in influencing appetite through metabolic, endocrine as well as neural responses, and come to the conclusion that it is the total energy intake rather than source that may be the critical factor to address. Raubenheimer and Simpson take this forward in the article on nutritional ecology and show how using a flexible model that takes into account the hierarchical nature of nutrition may provide links in a broader nutritional system, from human biology through the socio-ecologic environment, and thus provide a more practical way to tackle the problem of obesity through nutrition.

Taste plays a major role in influencing appetite, and people can be classified as supertasters, tasters or nontasters based on their response to bitter-tasting compounds[3]. The article by Keller and Adise probes the genetic aspect of taste, showing how the ability to taste bitter compounds (by the TAS2R38 receptor) is inherited. These genetic differences may account for individual differences in food preference, and studies show that children who lack this receptor tend to consume more dietary fat and are prone to obesity. In combination with studies by Rolls which show that signals that modulate taste and olfactory processing in early neural processing stages in rodents do not function in primates and humans, this makes for compelling evidence that overeating is a phenomenon that is not entirely under the control of an individual, and should therefore be considered as a form of addiction. This relatively new term – 'food addiction' – suggests that the overconsumption of foods high in refined sugars and fats could be compared to drug addiction, and should therefore be treated as a medical disorder (Carter *et al*.). The main advantage of this classification would be that there would be increased focus on both psychological as well as pharmacological treatment options for overweight individuals. In addition, recognition as a medical disease would decrease the stigma associated with obesity, as well as include possible public health policies that discourage the availability as well as consumption of obesogenic foods. However, the possibilities of misuse of this 'addiction', especially by the food industry need to be seriously considered.

Control of lipid homeostasis is the key to understanding the biochemical basis of obesity. Perilipins (Plins) are a family of proteins that coat cytoplasmic lipid droplets (CLDs) containing triglycerides and cholesteryl esters in the adipose tissue. The Plins, especially Plin1, play a key role in the regulation of lipid storage and mobilization from these CLDs mainly by protecting them from the action of cytoplasmic lipases. Kimmel and Sztalryd review the functions of Plins and their role in obesity, insulin resistance and lipocytotoxicity, and provide evidence that this could be a good pharmacological target to combat obesity.

Subcellular organelles have their own role to play in maintenance of cellular homeostasis. Mitochondria are the power sources of cells, and the interaction between mitochondria and disorders such as insulin sensitivity and obesity is detailed in the article by Koliaki and Roden. Lower mitochondrial function is the hallmark of insulin resistance and type-2 diabetes, whereas increased mitochondrial oxidative capacity is seen in obesity. However, mitochondrial function is both tissue- and animal model-specific, and therefore it is important to generate data on humans using state-of-the-art methods. Stevenson *et al*. focus on the role of the endoplasmic reticulum (ER) in the synthesis and sorting of lipids and signalling molecules. Specifically, the ER-associated degradation (ERAD) process which plays a key role in determining the quality as well as the quantity of cellular and secretory enzymes involved in lipid synthesis and degradation, provides an insight into both cholesterol as well as fatty acid fluxes in the liver.

Another major area of research that continues to be of interest in the *ARN* is that of micronutrients and their role in health and disease. Micronutrients include not just vitamins and minerals, but also trace elements, phytochemicals and antioxidants that have a role to play in maintenance of health and longevity. The growing interest in this area is partly due to the increasing (but not well-founded) commercial claims for the use of these substances in optimizing health and in the prevention of disease (http://www.eufic.org/article/en/artid/Polyphenols/). Among the minerals, iron and zinc remain the most studied and published elements, and in this context, it appears appropriate that the perspective article in this issue of *ARN* includes an autobiography of Robert Cousins, who served as its editor for a number of years. Cousins tabulates his research career starting from his postdoctoral work on calcium-binding proteins, to his later focus on minerals such as cadmium and calcium, and finally on zinc as his major field of interest. It is an interesting account of the transition of nutrition research from basic biochemistry into the era of technology-intense molecular biology. According to WHO, iron is one of the most important micronutrients in global public health terms (along with iodine and vitamin A), whose deficiency can cause a major threat to the health and development of populations the world over, especially in low-income countries (http://www.who.int/nutrition/topics/micronutrients/en/). However, the growing concern that excess iron could be just as harmful as iron deficiency, suggests

that there is no simple answer to maintenance of iron homeostasis – and this is the topic of the detailed article by Backe *et al*. Pasricha *et al.* describe the role of hepcidin as a master regulator of systemic iron homeostasis. The hepcidin–ferroportin axis is the mechanism by which systemic iron homeostasis is maintained via the action of the erythron-derived hormone erythroferrone, which appears to be currently the best candidate that could act as a regulator of this axis.

Flavonoids, a group of polyphenolic compounds that are found in all plants, are increasingly showing beneficial effects in various health-related issues. They mainly appear to have strong anti-oxidant and anti-inflammatory effects, and have shown benefits in a wide spectrum of diseases from flu[4] to diabetes and cardiovascular diseases[5]. Of the over 6000 known flavonoids, much attention has been focused on tea (green tea catechins) and citrus fruits (which contain vitamin C, in addition to a number of flavonoids). While citrus flavonoids have been shown to have wide-ranging benefits from lipid-lowering to anti-hypertensive effects, the actual mechanisms underlying these effects have not been completely established (Mulvihill *et al*.). Similarly, carotenoids such as lutein and zeaxanthin are present in the retina, and studies suggest that consumption of foods rich in these carotenoids (such as broccoli) may help in improving visual performance and reduce the risk of visual impairment (Mares). However, a common thread woven around all these small molecules is the lack of convincing human data, and therefore detailed studies in humans – both on healthy as well as patients with metabolic dysregulation are urgently required.

Finally, no area of research is complete without some reference to genetic or epigenetic controls, and this issue of *ARN* is no exception. Lemaire *et al*. discuss the relatively new field of 'disallowed genes' or 'tissue-specifically repressed genes', a phenomenon of cell-specific repression of housekeeping genes, observed initially in pancreatic beta-cells. This phenomenon ensures that insulin secretion is not allowed at inappropriate times such as between meals or after physical exercise, and is controlled by epigenetic mechanisms such as expression of miRNAs. Since the initial discovery of miRNAs, they have been considered as targets for therapeutic manipulation, and recent studies suggest that the expression of certain miRNAs can be modified through diet[6,7]. The articles by Hou *et al*., and Sapienza and Issa provide some interesting insights into dietary control of miRNA relevant to carcinogenesis.

On the whole, this issue of *ARN* makes for interesting reading and introduces the reader to a number of novel concepts that are at the cutting edge of nutrition research today.

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