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Gut Health, Wealth, and Feelings:
This Interface Matters

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'All disease starts in the gut', remarked Hippocrates more than twenty centuries ago. Perhaps by no means of coincidence, there is the Chinese idiom '病從口入', which literally means the acquisition of illnesses through the mouth. We are all mindful of the embryological development of the gut, with the origin from the foregut of the pharynx, oesophagus, stomach, and proximal duodenum; from the midgut, distal half of duodenum, jejunum, ileum, caecum, appendix, ascending colon, the right two-thirds of the transverse colon; and from the hindgut, the left one-third of the transverse colon, descending colon, sigmoid colon, and the rectum. High school biology students and medical undergraduates should be well versed with the structure of the gut as a tube that extends from the oral cavity through all these passages to the anal sphincter and its function as a conduit for transport, within which the processes of digestion, absorption, and elimination take place. Even at this level of understanding, the importance of gut health cannot be more obvious.

In this issue of the Journal, several original articles have explored the maintenance of gut function and biology. Tang et al performed a pilot study and demonstrated the potential usefulness of a new three-dimensional high resolution anal anorectal manometry in the assessment of anal sphincter function and surgical outcomes in children with various defecation disorders.¹ In another study, the use of paediatric antegrade continence enema in the management of children with faecal incontinence was reviewed.² These articles focussed on the tackling of mechanical dysfunction of the gut. On the other hand, Fang et al described the trial of faecal microbiota transplantation in a small cohort of children with chronic bowel diseases including Crohn's disease, ulcerative colitis, and pseudomonas colitis, but found limited effects.³ While the findings of the latter study should not be over-interpreted, it reminds us of what can be regarded as the wealth of treasure within the gut imparted to us by nature since the very day we are born.

The gut is quick to be colonised by microbes early in life. Microbiota refers to the bacteria, archaea, microeukaryotes, and viruses that share the space within the human body.⁴ These microorganisms may engage in a commensal, symbiotic, or pathogenic relationship with our body. While commonly denoted previously as commensal organisms, the gut microbiota is increasingly recognised to have a key role in health and disease.⁵ It is no surprise therefore to find that the practice of 'faecal medicine' was documented thirty centuries ago in the 'Collection of 52 Prescriptions' (五十二病方), in the second century in the 'Synopsis of Golden Chamber' (金匱要略) describing the oral intake of human faecal suspension popularly known as the 'yellow soup' to treat food poisoning by Zhang Zhongjing, and the subsequent adoption of the practice by famous Chinese practitioners including Ge Hong in the fourth century and Li Shizhen in the sixteenth century.⁶ In western medicine, faecal microbiota transplantation has shown promise in the management of *Clostridium difficile* infection,⁷ and attracted increasing research interests in its utilisation for management of inflammatory bowel disease, functional gut disorders, and obesity and diabetes.⁸

Beyond its therapeutic potential, the richness of microbes in the gut is linked also to health. Individuals with low bacterial richness have been found to have higher overall levels of body fat and inflammation-associated characteristics than those with higher bacterial richness.⁹ An energy-restricted diet may increase microbial richness and decrease inflammation in obese and overweight people who have low microbial richness.¹⁰ Beyond health, gut microbiota may be associated with allergic disease in children,¹¹ cardiovascular health and disease,^{12,13} and even psychiatric illness.¹⁴

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As the saying goes, 'I feel it in the gut'. An interesting perspective of viewing the brain development in the context of developmental biology of the gut, a 'microbial organ', and its capacity to metabolise the various diets has been proposed recently.¹⁵ This awaits rigorous testing of its hypothesis. On the other hand, more robust data have provided evidence on the existence of gut-brain crosstalk in term of a complex, bidirectional communication system that not only ensures homeostasis of the gut but possibly also exerts effects on affect, motivation, and cognitive functions.¹⁶

The gut functions well beyond the role of a conduit. It functions more than a membrane of absorption of nutrients and a passive filter of undigested waste materials. The gut is the interface between the body and the outside world. It represents a large surface, albeit at risk of exposing to vulnerability, for interacting with the outside environment. It must be rendered accessible to nutrient absorption, while at the same time be defensive against pathogenic attacks. It is a platform for establishing a symbiotic and mutually beneficial relationship with the microbiota. It is a large sensory organ that is in constant communication with effector systems including the gut endocrine, neuronal, and immune system.¹⁷ The understanding of the gut-brain communication¹⁶ and gut-heart interaction^{12,13} is emerging. It becomes intuitive to ensure the well-being of this interface as it matters much beyond it.

When this editorial is read, the 13th Congress of the Asian Society for Paediatric Research hosted by the Hong Kong College of Paediatricians from 6 to 8 October 2017 would have just been concluded successfully, the abstracts of which would be published in the upcoming issue of the Journal. This Congress is an interface whereby basic research meets clinical medicine, personalised medicine translates to public health policies, and scientists interact with clinicians. It is the interface whereby the enormous diversity and wealth of the paediatric research and clinical data mix and synergise to achieve excellence in child health. A healthy gut is but an example of the importance of a diversified, harmonious, and functional interface for the betterment of our health and beyond.

YF Cheung
Chief Editor

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