A multidisciplinary approach to paediatric and adolescent metabolic health

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Poor metabolic health in paediatric and adolescent populations describe a wide range of conditions that can negatively impact the development and quality of life of children and young people. Prevention, management, and treatment of these conditions can be particularly challenging as they often simultaneously affect a variety of organs and body compartments, highlighting the need for multidisciplinary care teams and interventions. To bring together the latest thinking in these areas, The Lancet Diabetes & Endocrinology, The Lancet Child & Adolescent Health, EClinicalMedicine, and EBioMedicine present a cross-journal Series of five Reviews highlighting the efforts and progress being made in several areas of childhood metabolic health and disease.

In EBioMedicine, Oyarzábal and colleagues[1] discuss recent advances in understanding the molecular mechanisms of energy metabolism in the brain during infancy and childhood. In contrast to our knowledge of adult neurological diseases, understanding paediatric neurological disease represents a neglected area of research. The authors examine current insights regarding paediatric brain energetics and delve into the main groups of inborn errors of energy metabolism affecting the brain. Energy metabolism disturbances in well-known non-metabolic neurodevelopmental disorders are also reviewed. It is hoped that by understanding the mechanisms that underlie brain energy disturbance one can help develop new metabolic modulation therapies.

Childhood obesity is one of the most concerning public health crises in our times. In EBioMedicine, Ching and colleagues[2] discuss recent developments in understanding the connection between early-life bacterial gut microbiota and obesity in children and adolescents. Important ecological drivers affecting the community dynamics of early gut microbiota are reviewed. Key pitfalls—such as maternal factors and antibiotic use—are highlighted for consideration when attempting to decode patterns of microbiota and their health consequences. Directions are also provided to help guide future studies. The overarching aim is to identify predictive and corrective measures for the better management of paediatric metabolic disorders, based on the detection and manipulation of early gut microbiota.

Childhood, adolescent, and young adult cancer survivors are at increased risk of low bone mineral density and consequently fragility fractures. As such, timely diagnosis and treatment of these survivors is crucial to mitigate adverse skeletal outcomes later in life. In The Lancet Diabetes & Endocrinology, van Atteveld and colleagues, on behalf of the International Late Effects of Childhood Cancer Guideline Harmonization Group, provide harmonised recommendations for bone mineral density surveillance to facilitate earlier diagnosis, treatment, and follow-up of survivors with low or very low bone mineral density.[3] The authors also identify knowledge gaps for future research to focus on, with the goal of further improving bone mineral density surveillance and fracture prevention strategies in this vulnerable population.

A recent Review[4] in The Lancet Child & Adolescent Health addresses a common yet often overlooked paediatric metabolic health condition: familial hypercholesterolaemia. A dominantly inherited disease, familial hypercholesterolaemia often causes high concentrations of low-density lipoprotein cholesterol and leads to premature atherosclerosis, cardiovascular disease, and early mortality. Early diagnosis and treatment is therefore essential to improve prognosis. Reijman and colleagues[4] provide a timely overview of lifestyle modifications and current pharmacological treatment options and explore promising novel lipid-lowering treatments that have shown promise in adults with familial hypercholesterolaemia, and which are now being studied in children.

Type I and Type II paediatric diabetes represent significant impacts on the quality of life of young people potentially leading to lifelong complications. The role of deprivation and the ethnicity of children with diabetes, play a crucial role in both management and outcomes of these metabolic disorders. Utilising recent data from the UK National Paediatric Diabetes Audit, Hindmarsh and colleagues[5] in EClinicalMedicine discuss current

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understanding of the relationship between socioeconomic status, ethnicity, and childhood diabetes prevalence and outcomes. This Review details differences in markers of diabetes progression between ethnicities in a number of settings, looks at the potential underlying causes and discusses issues such as access to appropriate care. The Review concludes by recommending potential strategies for ensuring paediatric diabetes healthcare equity across all socioeconomic and ethnic backgrounds.

These five Reviews emphasise that progress in the management of paediatric and adolescent metabolic health is built from an understanding of the fundamental biology to enable rational, evidence-based decisions and actions regarding prevention, diagnosis, and treatment. Improvements in access to childhood therapies and mental and social support for carers, as well as an increase in equitable metabolic health care globally, remain additional challenges. Cooperation and coordination between basic, translational, and clinical research is key to achieve progress that will bring true benefits to children and young people with poor metabolic health.

Declaration of interests

The authors declare no conflicts of interests.

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