

## **Iron deficiency during the first 1000 days of life: are we doing enough to protect the developing brain?**

Elaine K McCarthy

*Cork Centre for Vitamin D and Nutrition Research, School of Food and Nutritional Sciences, University College Cork and INFANT Research Centre, Cork, Ireland*

Iron is essential for the functioning of all cells and organ systems, but perhaps most critically for the developing brain, given its key role in the fundamental neuronal processes of myelination and energy and neurotransmitter metabolism. Iron deficiency, especially in the first 1000 days of life, can therefore result in long-lasting, irreversible deficits in cognition, intelligence, motor function and behaviour. Pregnant women and infants are most vulnerable to iron deficiency, given their high requirements to support growth and development, coupled with a frequently inadequate dietary supply. Several common pregnancy-related conditions and lifestyle factors can affect maternal-fetal iron supply and accretion in utero, resulting in an increased risk of iron deficiency in the mother and her fetus, even if dietary supply is adequate. In addition to the acknowledged risks of preterm birth, gestational diabetes mellitus and intrauterine growth restriction, more recent evidence from our own group and others suggests that maternal obesity, smoking and delivery by Caesarean section further increase the risk of iron deficiency, particularly in the newborn infant, which can persist into early childhood. Despite the considerable threat that early-life iron deficiency poses to long-term neurological development, life chances and the overall social and economic progress of a country, strategies to tackle the issue are non-existent, too limited or totally inappropriate. Prevention strategies, focused on improving the health and nutritional status of women of reproductive age, prior to entering pregnancy, are required. The development of screening strategies to enable the early detection of iron deficiency during pregnancy and early-life should be prioritised, with the dual purpose of protecting the health of the mother and her child's developing brain.