Prenatal programming of physical activity and sedentary behaviors

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Physical activity carries multiple health and developmental benefits, and sedentary behaviors disadvantages across the lifespan. Given the benefits, recommendations of physical activity have been published. In children aged 10-18 years, the focus population of the current project, the Finnish national recommendations endorse at least 60 minutes of physical activity in a day, that vigorous physical activity should be performed at least three days a week, and that excessive and prolonged sedentary behaviors should be avoided. Among the Finnish children, these national recommendations are, however, poorly met. To develop effective interventions, it is imperative to identify groups of children at risk for physical inactivity and sedentary behaviors as early in life as possible, preferably before their physical activity patterns and behaviors have been established. Preclinical models have shown that prenatal exposure to environmental adversities may "programme" a physical inactive phenotype, but the role in humans remain unclear. Therefore, the overarching aim of this project is to study if physical activity and sedentary behaviors in 10-18-year-old children have origins in the prenatal life. This project also studies physical activity and sedentary behaviors as highly polygenic traits, and tests the role fetal metabolome plays in understanding these associations. These aims cross two of the thematic areas of the ACTIVE programme: identification of early life risk factors of physical inactivity and sedentary behaviors allows *promoting a physically active lifestyle from early life onwards and therefore also increases participation in sports and physical activity.* The major impact of this project is that it will allow tailoring prevention interventions to groups before their physical activity patterns and behaviors have been established and contribute to promotion of physically active lifestyle, and reduction in costs physical inactivity and sedentary behaviors incur to society.

Related publications:

Vickers MH et al. Sedentary behavior during postnatal life is determined by the prenatal environment and exacerbated by postnatal hypercaloric nutrition. Am J Physiol Regul Integr Comp Physiol 2003; 285; 271–273 12. https://pubmed.ncbi.nlm.nih.gov/12794001/

Zhu S et al. Developmental programming of energy balance regulation: is physical activity more 'programmable' than food intake? Proc Nutr Soc 2016; 75: 73–77. https://pubmed.ncbi.nlm.nih.gov/26511431/

Wijtzes AI et al. Correlates of physical activity in 2-year-old toddlers: The Generation R study. J Pediatr 2013;163:791-799. https://pubmed.ncbi.nlm.nih.gov/23523279/

Hildebrand M et al. Prenatal, birth and early life predictors of sedentary behavior in young people: a systematic review. Int J of Behav Nutrition and Physical Activity 2016;13:63 https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-016-0389-3

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