Intergenerational epigenetic programming in a mouse model of undernutrition

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Environmental factors during early life contribute to the later metabolic health of the individual and of future progeny. The extent, if any, to which epigenetic mechanisms contribute to inter-generational metabolic inheritance, and the precise mechanisms involved, are subjects of considerable biomedical interest. Imprinted genes have been proposed to be uniquely susceptible to environmental compromise in utero and to contribute to later adult metabolic disease. Using a mouse model of maternal caloric restriction during pregnancy affecting the metabolic physiology of two generations including paternal transmission to the second generation, we will explore two questions: (i) Are imprinted genes more or less susceptible to environmental compromise and hence may be ‘developmental programming genes’ and (ii) is the paternal experience of in utero undernutrition, resulting in metabolic defects in his offspring, an epigenetically inherited memory transmitted via his sperm methylome?