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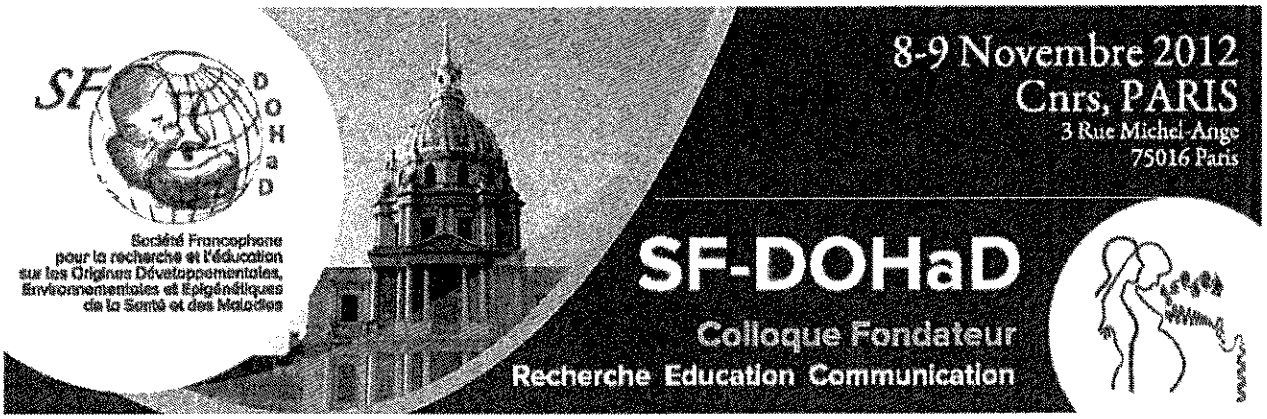

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POSTER N°61

Transcriptional and epigenetic signatures of adaptive increased resistance to diet-induced obesity by dietary alleviation of malprogramming by maternal obesity during gestation

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Maternal obesity and type 2 diabetes (T2D) at conception and during gestation promote the development of obesity and diabetes in adulthood.[1] However, very few studies have considered whether and how appropriate nutrition could alleviate this malprogramming. An important proportion of inbred animals develop resistance to the obesogenic effects of a high-fat diet (HFD), regardless of the species, the window and mechanisms at stake.[2] In a previous study, we showed that despite maternal obesity and T2D, a control diet (CD) during the periconceptional/gestation/lactation period led to a pronounced sex-specific shift from susceptibility to resistance to a HFD in the female offspring.[3] The aim of this study was to determine the molecular mechanisms of resistance and susceptibility, and how a CD could alleviate the effects of maternal obesity and T2D on the fetus and increase resistance. Despite being similarly lean (resistant) or obese (sensitive), F2 and F1 mice clearly differed in several aspects of their metabolism, with F2 mice presenting obvious features of 'adaptation' on the HFD. Expression data using a custom-built mouse microchip for the liver and quantitative RT-PCR for muscle and adipose tissue highlighted that adaptative processes in F2 mice were associated in the liver with an enhancement of pathways protecting against steatosis, the recruitment of unexpected neurotransmission-related genes and the modulation of a vast imprinted gene network. In the adipose tissue, adipogenesis and lipid storage were also modified in F2 mice. Global DNA methylation and several histone marks assessed using LUMA technique and western blot analysis, as well as the expression of 15 genes encoding chromatin-modifying enzymes, supported the response and adaptation to HFD, in a generation- and tissue-specific manner.[4] Thus, improvements in the nutrition of obese and diabetic women during pregnancy would be an efficient management strategy, with lower risks than current strategies on the basis of weight loss or nutrient supplementation, which may have a negative impact on fetal programming.

Key words: developmental programming, DOHaD, epigenetics, fatty liver, hepatocellular carcinoma, high-fat diet, metabolic syndrome, nutrition, obesity, sexual dimorphism, type 2 diabetes

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TOWARD DIETARY AND THERAPEUTIC RECOMMENDATIONS?

10 – L. Najar and D. Luton

Long-term consequences of prematurity, oxidative stress, noxious neonatal environmental and diet-induced obesity on metabolic and cardiovascular disorders are examined. Regarding the programing of appetite, an assessment of neonatal weight loss with child weight at 1 and 3 years was presented. In view of the importance of dietary supplementation for optimal development, authors provide insight into the impact of prenatal vitamin D on cord blood level. Intake of bioactive molecules (docosahexaenoic acid and arachidonic acid) from milk during development of premature newborn was examined.

ORAL N°52

Long-term consequences of neonatal pain and analgesia on growth, behavior and corticotroph axis in rat

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Previous data reported that a noxious neonatal environment alters brain development and is responsible for diseases in adulthood (metabolic syndrome, obesity).[1] With advances in medical care over the last two decades, the number of newborn infants exposed to chronic pain has considerably increased,[2,3] and this has led to the augmentation of the use of opioid to induce analgesia.[4] However, the long-term effects of perinatal