

APC Microbiome Ireland Press Release – 29 May 2018

Eating oily fish may help mothers have babies with healthy weight and healthy guts

A new study from the Science Foundation Ireland Research Centre APC Microbiome Ireland at Teagasc and University College Cork, together with collaborators at Massachusetts General Hospital/Harvard University, has found that mothers who eat healthy fats from oily fish may help their children form healthy guts and maintain healthy weights throughout their lives.

The new research, published in *Microbiome*, shows that, in laboratory mice, babies gained less weight on a high fat diet if they were born to a mother who had more healthy fats called omega-3s in her body. The mice also gained less weight if they breastfed from a mother with more omega-3 fats. Interestingly, this only occurred in male babies; the mother's fats had no effect on weight in female babies.

The modern Western diet is deficient in healthy omega-3 fats, which are found in oily fish, nuts and seeds. Humans can't produce these fats in their body and need to get them from their diet. Instead, the Western diet is overloaded with less healthy omega-6 fats, which are found in vegetable oils and fried foods such as chips and crisps. This imbalance in dietary fats may contribute to obesity, heart disease and other chronic diseases. But prior to this study, little was known about how mothers' omega-3/omega-6 ratios affect their children's health.

In this study, the balance of omega-3 and omega-6 fats in the mother's body was also found to affect the health of her pups' guts. If a mother had more omega-6 fats in her body during pregnancy or breastfeeding, her pups' guts were more 'leaky', which led to inflammation in their blood. These babies also had more unhealthy bacteria in their intestines, which may have contributed to their weight gain. However, if these pups were breastfed by a mother with a more healthy ratio of omega-3: omega-6 fats, their guts were healthier and had more healthy bacteria. Interestingly, the effect of mother's fat on her babies gut health continued throughout their life until they were adults.

Commenting on the study, Dr. Ruairi Robertson, the lead author, said: "we have shown that a mother's diet during pregnancy and breastfeeding may affect her babies' weight and gut health in the long term. Furthermore, we know that your gut bacteria are extremely important for your overall health, particularly to maintain a healthy weight and gut. These results suggest that if a mother eats more healthy fats and less unhealthy fats during pregnancy and breastfeeding, she may be able to help the right types of microbes grow in her baby's intestines and form a healthy gut for later life".

Prof Jing Kang at Massachusetts General Hospital and Harvard University added "our study, using unique transgenic mouse models, has produced reliable data suggests two important things: 1) a balanced ratio of omega-6/omega-3 fats in a mother's body during pregnancy and breastfeeding is critical for reducing risk of

obesity in her children over lifetime, and 2) microbes in her baby's gut is a key player in mediating this effect."

Previously there have been concerns over pregnant women eating too much fish due to the potential dangers of mercury. However, this is only a concern for certain types of fish, particularly predatory fish such as shark, swordfish and certain types of tuna. Current recommendations suggest that everyone, including pregnant women, eat 2 portions of oily fish (mackerel, salmon, sardines, trout, herring) per week. "The benefits of omega-3s from oily fish far outweigh the risks of mercury, if kept to 2-3 portions per week" says Prof. Catherine Stanton, Principal Investigator at Teagasc and APC Microbiome Ireland. "However, most important is the balance of fats. Aim to get enough omega-3s from oily fish, nuts and seeds whilst at the same time reducing omega-6 intake from vegetable oils and fried foods".

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Original reference:

Maternal omega-3 fatty acids regulate offspring obesity through persistent modulation of gut microbiota Ruairi C. Robertson, Kanakaraju Kaliannan, Conall R. Strain, R. Paul Ross, Catherine Stanton and Jing X. Kang (2018) *Microbiome* 6: 95
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About APC Microbiome Ireland

The SFI Research Centre APC Microbiome Ireland (APC; <http://apc.ucc.ie>) is a world leading research institute which was formed in 2003 with funding from Science Foundation Ireland and in conjunction with key industry partners. It represents a seamless collaboration between University College Cork and Teagasc (the Irish Agriculture and Food Development Authority). It is widely recognised that the gut microbiota plays an important role in human health and has become one of the most dynamic, complex and exciting areas of research in both food and pharmaceutical arenas. Over the last decade the APC has established itself as one of the leading global centres in gut microbiota research. The APC has made several landmark discoveries and has published over 1,700 research articles in peer-reviewed journals, generating many journal covers and associated editorials. The APC comprises over 300 individuals, from the scientific PI's (the APC Faculty) funded by the partner

Institutions, the management team, and a dedicated group of research scientists, research assistants and postgraduate students.

About Teagasc

Teagasc – the Irish Agriculture and Food Development Authority – is the national body providing integrated research, advisory and training services to the agriculture and food industry and rural communities. The Teagasc mission is to support science-based innovation in the agri-food sector and wider bio-economy that will underpin profitability, competitiveness and sustainability. Its food research programme is delivered from two research centres in Moorepark, Fermoy, County Cork and Ashtown in Dublin.