The Importance of Gut Microbiota

Posted 1 year ago by Sarah

Nutritionists, microbiologists & probiotic companies have been banging on about the importance of bacteria for years. But is this idea starting to really gain some ground within wider circles? I certainly think so, and am excited by this sudden awakening of the mass media!

The human microbiome

The Economist published a long article last weekend[1] about the human microbiome (the scientific term for all of the collective bacteria cells found in the body.) I've heard a funny (yet plausible) theory that if aliens came down to earth and analysed our bodies, they might well come to the conclusion that we are simply vessels for bacteria. After all, those tiny little microbes collectively make up an awful lot of our body mass. The Economist noted this in its article, 'The human microbiome: Me, myself, us'; stating that biologically speaking, the human being is an ecosystem of bacteria - aka - the microbiome.

Bacteria is found in your gut, mouth, scalp, skin, and more or less any crevice or orifice you can thnk of on your body. In fact, your gut alone is thought to contain an impressive 100 trillion bacteria. When thinking about health conditions such as wind, bloating, fatigue and so on, it is important to question whether or not they in fact relate back to bacteria in the body - aka, your microbiome.

Image illustrating the human ecosystem - from the Economist

Does your bacteria define you?

The article prompts the question - are we are correct to define our biological make up so largely by our genes, as we currently do - when in fact, bacteria might make for a more effective and detailed defining criteria? After all, from our parents we receive 23,000 different genes (sounds an awful lot), yet the microbiome is thought to be made up of a whopping 3 million different kinds of bacteria!

The writer goes on to examine the link between one's microbiome, and disease; '...from obesity and diabetes, via heart disease, asthma and multiple sclerosis, to neurological conditions such as autism,

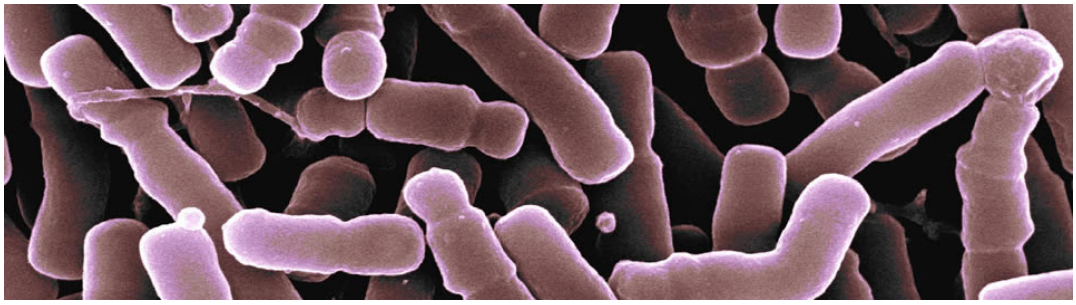
the microbiome seems to play a crucial role.' [my links added for further info].

IBS & *C. difficile* disease

Probiotics, it states, have been shown in clinical trials to help relieve symptoms (such as bloating) of people with Irritable Bowel Syndrome (IBS) - who, incidentally, have been shown to have different bacterial populations to those without IBS. You can read more about Irritable Bowel Syndrome and bloating and the way they relate in this article. They also went on to look at other diseases, including *Clostridium difficile* disease. The pathogen '*C. difficile*', commonly referred to as a superbug, causes severe diarrhoea and is thought to kill 14,000 people a year in America alone. This bacteria is notoriously difficult to tackle, largely because many strains of *C. difficile* develop a resistancy to common antibiotics. New faecal transplant therapy (yes, it is what it sounds like - icky, but could well be life-saving) is proving to be of great success, and is potentially the answer. Faecal populations from a healthy donor are full of beneficial bacteria which can repopulate the patient's gut with a healthier balance of gut microbiota - and this can seemingly cure the deadly disease. (More here about *C. difficile* and faecal transplants, or *C. difficile* and probiotics)

In a final paragraph entitled 'Generation Game' the article in the Economist states that many bacteria are passed through the generations. 'Many bugs are picked up directly from the mother at birth' - a fact that probiotic companies have been trying to promulgate for years, reinforcing the idea that during pregnancy a woman must ensure she has essential nutrients not only such as folic acid and calcium, but also a healthy balance of good bacteria. Various studies over the last ten years have related a mother's bacteria throughout pregnancy and/or breastfeeding to the likelihood of her child developing eczema[2], food intolerances, allergies[3],[4] and more. What's more, research has found children born by Caesarean section more likely to become obese in later life[5]. (This may well be linked to the fact that babies are thought to gain bacteria from the mother in the vaginal tract during birth.)

The article finishes on the exciting observation that although the genome cannot be modified, the microbiome is medically manipulable to a larger extent, and concludes; 'If the microbiome does turn out to be as important as current research is hinting, then a whole new approach to treatment beckons.' Exciting indeed!



Could microbes - which make up 1.5kg of your body weight - play a larger role in your health than is currently thought?

Gut Bacteria & Obesity

Also just last week a large study[6] was published, of over 10,000 children, suggesting that babies given antibiotics before the age of six months old are much more likely to become overweight as children. The study was published in the International Journal of Obesity, and reported by a wide range

of newspapers including the Telegraph and the New York Daily News. 11, 532 babies born in the UK's Avon region in 1991 & 1992 were enrolled in a long-term study on their health, which found that infants given antibiotics during their first 5 months of life were likely to weigh more than infants not given antibiotics at that young age. By 38 months of age, the difference in weight between infants exposed to antibiotics and those not, was an astounding 22%. Interestingly, babies given antibiotics between 6 - 14 months did not have a significantly higher body mass than those not given antibiotics - suggesting that the particularly young age was a key factor in the effect of antibiotics on weight. However it could be fair to infer from this study, and others, that gut bacteria has an influence on weight management. Although obesity is a almost always put down to diet, exercise, and genes, weight management is increasingly looking like a complex subject. This research suggests that in fact, bacteria have a quintessential role to play in weight management. It is not the first study to suggest such a thing (although it is novel in its examination of such a young age.) To find out more about gut bacteria and weight loss, read this summary of previous studies.

Whilst antibiotics have seen human healthcare through incredible advances over the last 60 years, and still play an essential role in the treatment of many diseases to this day, there is strong evidence that antibiotics 'kill off' a variety of bacteria and microbes in the body - including the 'good bacteria' thought to help with digestive health and immunity. This is an area which desperately needs further research, as imbalances in gut microbial populations which result from antibiotics can in turn cause health conditions such as diarrhoea, constipation, bloating, and even more serious diseases, like *Clostridium difficile*, or potentially obesity, as hinted in the study mentioned above.

Digestion

Most current research into probiotics or live cultures is restricted to the realm of digestion. Many studies support the idea that probiotics - these beneficial microorganisms, can support digestive health. Another recent study[7] of infants found that a certain family of probiotic bacteria, Bifidobacteria, can be beneficial for babies; helping them to better digest breast milk. Daily papers are beginning to report more about probiotics - increasingly acknowledging the large variety of beneficial microorganisms. Even last year the Daily Mail talked about '*Saccharomyces boulardii*' a particular probiotic thought to support digestive health in case of diarrhoea.

The interesting point now coming to scientists' (and increasingly the media's) attention is that probiotics may not simply be a 'buzz word' due to dissappear as fast as it seemed to sneak up on us! Looking at the various types and strains of bacteria which reside in each of our personal ecosystems could not only be a clue to supporting digestive health (for example using specific probiotics for bloating) , but could also be hugely important in other conditions, including our immune systems, our weight, and even our mental health[8].

Looking after your gut bacteria, and topping up your probiotics certainly seem worthwhile. Meanwhile, let the research roll on!

Further Reading:

The Economist - Microbes Maketh Man

UK Support site for Clostridium difficile disease

BBC News: C. difficile could be cured by faecal transplants

About OptiBac Probiotics

Jarret Morrow: Could Probiotics help with Weight Management?

The Virtual Museum of Bacteria

References:

1. http://www.economist.com/node/21560523

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5. Huh, S. et al. (2012) Delivery by caesarean section and risk of obesity in preschool age children: a prospective cohort study. Arch. Dis. Child. 10. 1136.

6. Trasande, L. et al (2012) Infant antibiotic exposures and early-life body mass. International Journal of Obesity.

7. Mills, D. A et al. (2012) Endo-β-N-acetylglucosaminidases from infant-gut associated bifidobacteria release complex N-glycans from human milk glycoproteins. Molecular & Cellular Proteomics.

8. Lyte, M. et al.(2011) Probiotics function mechanistically as delivery of vehicles for neuroactive compounds: Microbial endocrinology in the design and use of probiotics. Bioessays. Published online ahead of print