

Human-Microbe Entanglements

Food Allergies in Japan and the UK

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In February 2014, as I was anticipating the start of hay fever season in Japan, I happened to turn the TV channel to a program that mentioned a particular brand of yoghurt that is said to mitigate hay fever symptoms. Percolating in the back of my mind was information from adverts for other yoghurt products such as Yakult (created by a Japanese scientist in the 1930s), which is made using ‘good’ bacteria, but I had never previously paid it much attention. The upcoming pollen season, combined with an allergic body (hay fever, eczema, asthma, and food allergies) had me, however, happy to try bacteria in an attempt to ameliorate feeling ill for a quarter of the upcoming year. I began eating (and then making) the advertised brand of yoghurt, taking a daily powdered probiotic well known in Japan for helping re-balance gut health, and shifted my diet to include more fibre and fermented foods, whilst attempting to eat less refined sugar. Unbeknownst to me at the time, an increasing body of literature has emerged over the last decade that indicates just how fundamental our gut health is to our immune systems: and non-humans are integral to this.

With only around ten percent of human bodies made up of ‘human’ genes, the rest of us consists of trillions of microbes, parasites and viruses: the microbiome (Smart and Smart 2017). With the completion of the Human Microbiome Project (<https://hmpdacc.org/>) we know more than ever before about the symbiotic entanglements between humans and their microbes (or microbes and their humans), and anthropological interest on epigenetics, microbes and humans is on the increase (Benezra, et al. 2012; Blackman 2016; Lock 2015, 2017; Nading 2013, 2016). What does this understanding of the microbiome say about what constitutes a human? Some suggest we are “supraorganisms” because our microbial genetics differ from person to person (Benezra, et al. 2012: 6378), others

that we are ‘superorganisms’ consisting of hosts (us) and parasites (Honda and Littman 2012; Lederberg 2000), whilst others suggest we are—and have ever been— posthuman (Smart and Smart 2017). Recent discoveries about our microbial companions allow us to expand on and reconceptualise our ideas of what constitutes a human, and complicates ideas of health and illness. It moves human medicine beyond what has thus far been considered ‘human’ to explore what effects our microbial companions have in the development of disease, with hopes for potential microbial therapeutic interventions—microbes as medicines—in the future (Gallagher 2018). Whilst authors like Ingold (2000, 2017) have long stressed the correspondences between humans and their environments, human-microbe research has begun to show us how we are ourselves complex ecosystems and environments. Both our external *and* internal ecosystems exist in symbiosis with multiple others, without whom we wouldn't be ‘human’, with implications for our understandings of health and illness.



Figure 1: Homemade *tsukemono* (pickles), yoghurt and miso (with *shiso*) dip (photo by author).

Research suggests that human-microbe entanglements—our microbiomes—play a role in chronic illnesses ranging from irritable bowel syndrome (IBS), coeliac disease, asthma, and allergy, to depression, obesity, and autism to name just a few (Bull and Plummer 2014; Carding, et al. 2015; Shreiner, et al. 2015; Wang, et al. 2017). In research on food allergies—which are immune responses to usually innocuous food proteins that can result in severe anaphylactic reactions—the microbiome has emerged as a key field of potentiality with research picking up

speed in the last three years (see for example, Blázquez and Berin 2017; Hirsch, et al. 2017; Huang, et al. 2017; Johnson and Ownby 2017; La Fata, et al. 2017; O'Mahony 2015; Prince, et al. 2015; Smolinska, et al. 2017; Smolinska and O'Mahony 2016; Tang, et al. 2015; Wesemann and Nagler 2016). This research suggests that there is a complex relationship between the microbiome and food allergy, and altering microbiome diversity is heralded as a possible prevention for food allergies. Whilst some researchers are hopeful of these new avenues of research, suggesting *potential* cures in the future (Hsiao, et al. 2017; Tang, et al. 2015) others have called for caution in reading such results. Whilst a diverse microbiome *may* help in the management of food allergies and *potentially* reduce the severity of reactions there are not yet any definitive answers, except that our symbiotic microbes appear to be essential for human health and immune function. Whilst moving us to think about humans in new ways, such research has also galvanised the production of new partnerships and an expansion of a pre and probiotic market, which in 2015 was worth more than 34 billion USD (Global Market Insights Inc 2016).

Food allergy reactions can be severe, leading, in some cases, to impairment or death. The stakes are therefore high to find ways to mitigate the severity of reactions, and hopefully, to find a cure. In my research on the experiences of food allergies in Japan and the U.K., microbes have emerged in various ways: entangled with human health in interactions with medical doctors and at allergy and immunology conferences, referenced by individuals taking pre- and probiotics in an attempt to create hospitable environments for 'good' microbes, and debated about by parents who are divided as to the use of pre and probiotics: some want hard evidence, others are desperate to do what they can to try and maximise their, or their children's, well being. But in all cases, humans and their microbes cannot be disentangled. Clinical practice in Japan and the UK with regard to food allergies and the microbiome is shaped not only by different understandings of best practice, but also by existing food cultures and the different medical strategies that are currently being used to manage food allergies in different places.

Among the people I've worked with in Japan, fermented foods that are good for microbial diversity like *tsukemono* (pickled vegetables) and *natto* (fermented beans) are, typically, a regular part of the diet. Discussion of gut health is part of an (often implicit) shared common sense of having a healthy, nutritious diet. As such most of the individuals I have worked with have not directly referenced the microbiome. When they talk about gut health they use terms such as gut bacteria/intestinal bacteria (*chounai saikin*). Rather than making a conscious decision to shift dietary practice to encourage microbial diversity through taking

probiotics or eating different foods, the focus for many is on potentially starting their children on Oral Immunotherapy Treatment (OIT). OIT is not a cure, but instead aims to increase the immune system's tolerance for the allergen(s) through slowly, and incrementally, increasing the amount of the allergen they ingest under a doctor's careful supervision (Ebisawa, et al. 2017). Patients must continue taking the allergen every day except in situations of bodily stress such as illness or travel, during which time they take a break. Though clinical practice varies, if OIT is an option it is usually done slowly and only one allergen at a time is introduced and worked on. The aim—and hope—is that should a child accidentally ingest their allergen they will experience a mild reaction instead of severe anaphylaxis, though severe reactions do also happen (Ebisawa, et al. 2017). Although OIT is not yet available as a routine treatment on the health insurance system it is usually available at large university hospitals and some clinics (ibid.). In addition, such methods have been getting greater exposure in Japan through their introduction on popular television programs like NHK's *Gatten*, which focused on food allergies in their January 31st 2018 program¹.



Figure 2: Homemade *amazake* (a drink made from fermented rice); (photo by author).

Whilst the Japanese doctors I have spoken with suggest that a healthy, nutritious, well-balanced diet is important, it remains—for many—an implicit common sense that is not being explicitly tied to clinical concerns in the management of food allergies. Instead, for doctors involved in OIT the clinical common sense is either avoidance or, more recently, about building tolerances rather than changing microbial diversity. Although there is an increasing emphasis and prevalence of

OIT in Japan not all physicians advocate its use because of the risks of severe reactions throughout the process, and not all parents feel the risk is acceptable and seek other options. Doctors who don't offer OIT typically advise patients to strictly avoid eating the food allergen(s), however, some explicitly link gut health to food allergies. For example, parents I have worked with have debated and discussed the methods of a well-known doctor who, in clinical practice, actively puts gut health and intestinal bacteria at the centre of his advice and management of food allergies. For him, oral immunotherapy treatment is not the first step, nor advisable. Instead, he recommends that all identified food allergens be removed from the environment of the allergic individual, meaning that each family member should also refrain from eating that person's allergens. He advocates engaging in a consistent and concerted effort to alter gut health through increased consumption of fermented and unprocessed foods that promote healthy microbial diversity. There is extended debate about this by parents of children with food allergies. Some trust him whereas others suggest it is a dangerous approach to try and reintroduce allergens when a child is older and they instead argue that OIT is the recommended *scientific* method. Most of these parents, however, consider the maintenance of gut health as a regular daily practice and implicit common sense through eating fermented foods, fibre and, where time permits, unprocessed foods. Most therefore do not see it as a sufficient potential treatment—or cure—of food allergies.

In the UK, meanwhile, maintaining gut health and microbial diversity is not initially, or implicitly, a part of common sense, but is more consciously developed over time and through practice. Most of the parents I have worked with have not had any discussions with their doctors about gut health, the microbiome, or diet more generally, except to be told to strictly avoid their allergens. What emerges from discussions and interactions with doctors in the UK and Europe at the European Academy of Allergy and Clinical Immunology (EAACI) conferences in 2016 and 2017 is that without more concrete evidence many doctors in the UK currently refrain from officially advising patients to take pre- and probiotics. Furthermore, OIT is currently only available through clinical trials and is therefore not a to go to method for the majority of children with food allergies. For a small number of parents however, especially those who have actively read about and researched food allergies, being told to avoid diagnosed allergens is not helpful or sufficient advice. Some have begun giving their children pre- and probiotics after hearing about the microbiome through friends, or as a result of doing extended research into the most recent medical research that suggests a link between food allergies and microbial diversity. Such individuals are typically buying pre- and probiotics as supplements rather than incorporating a range of fermented foods into their

diets, which is a contrast to gut health practices among the people I've worked with in Japan who don't typically buy microbes in a supplement form (except in times of stomach upset). Improving microbial diversity becomes for some—in the UK and Japan—a practice of nurturing beneficial microbiota in the hopes of changing bodily responses either via an implicit common sense about gut health and diet or through a conscious decision to purchase supplements.

Different food cultures, dietary practices, and the availability and understandings of medical practices such as OIT significantly mediate the ways that individuals engage with gut health and new research on the microbiome on human health in Japan and the UK. As medical knowledge and research on the links between allergy and the microbiome progresses, the ways that this information is disseminated and used by doctors and patients depends on numerous factors such as social and cultural understandings of gut health that already exist, the types of diet typically consumed, and the extent to which established scientific knowledge is privileged and sought. Tracing the complex entanglements of microbes and their humans is thus critical if we are to understand how scientific research on food allergies and the microbiome are being understood, transmitted and used in daily practice in different places.

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Notes

¹ <http://www9.nhk.or.jp/gatten/articles/20180131/index.html> and https://www.nhk.or.jp/kenko/atc_357.html

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