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Science commentary: Probiotics

Probiotics are microbes that protect their host, and in some cases they can prevent disease. They are immunomodulating bacteria that have very low virulence compared with the more pathogenic gut flora such as *Escherichia coli* and clostridia. *Lactobacilli* and *bifidobacteria* are examples of probiotics found in the large intestine.

Lactobacillus GG can prevent diarrhoea and atopy in children.^{1 2} In the gut, probiotic bacteria are thought to occupy binding sites on the gut mucosa, preventing pathogenic bacteria from adhering to the mucosa. *Lactobacilli* also produce proteinaceous compounds—bacteriocins—that act as local antibiotics against more pathogenic organisms. But what is known about what happens in vitro cannot necessarily be extrapolated to the complexity of the ecosystem of the human gut.

Diarrhoea associated with antibiotics is presumed to result from the antibiotics disrupting the normal flora in the gut of a healthy person. Such disruptions cause dysfunction of the gut's ecosystem, and they may allow pathogenic bacteria to colonise the gut and gain access to the mucosa. Whether probiotic supplements stop this process by reducing the disruption or by acting as substitutes for the healthy flora is unclear. Probiotics may compete with pathogens for the nutrients the pathogens need to grow, or they may modify toxins produced by pathogens or toxin receptors

found in the gut wall, or they may stimulate immune responses to pathogens.

The exact mechanisms by which probiotics prevent atopy are also under debate.³ One suggestion is that the establishment and maintenance of innate immune tolerance is mediated by T helper 1 cells and linked in some way to the faecal flora. If the Th1 response is particularly robust, the allergic response mediated by T helper 2 cells tends not to be so strong. Probiotics may prevent atopy by supporting the faecal flora, strengthening the Th1 response, and reducing the allergic response.

In the countries of continental Europe, probiotics are regarded as medicines, and they are prescribed alongside antibiotics. In other countries, probiotics are marketed as supplements and are sold over the counter—although preparations such as “bioyoghurts” do not always contain probiotic strains proved to be clinically useful.

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A memorable patient Can you hear me?

The young woman, brought by the police, looked past me, perplexed, eyes darting around the room. Some of my questions obtained brief answers, some none. Not all the answers were for me; “But he can’t be dead” seemed a response to another voice than mine.

As I was about to launch into further questions to establish a diagnosis, I was caught by a recollection of an earlier voice. It was that of the ward sister on the busy medical ward where, as a psychiatric registrar, I would assess people who had taken overdoses. I had noticed the young woman lying unconscious for over a week and had wondered, as I passed, whether she would ever recover. Approaching the next bed I heard the voice of the ward sister—a woman I regarded as efficient and a little

intimidating. I paused and listened (psychiatrists are generally inquisitive). Her voice was soft and barely audible above the bustle and beeping monitors, as she gently reminded the young woman where she was, what was happening, and who had visited, even adding snippets of ward gossip.

The woman in front of me now seemed lost in a world of voices, confusion, and fears. I realised that, while I needed to elicit symptoms to clarify diagnosis and establish a rational treatment plan, I must also try to explain what was and was not happening and, as far as possible, help her contact some reality through the fears provoked by psychotic symptoms.

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