

# Science Writing Competition 2016 – Winning entry

Below is the winning entry in the ‘18 and over’ category for the 2016 international Science Writing Competition organised by the University of the West of England’s [Science Communication Unit](#), [BBC Focus magazine](#) and the [Royal Institution](#).

**Winner: 18 and over**

## **Could micro-organisms manage your mood?**

**Kate McIntosh, aged 20**

The concept of probiotics - micro-organisms that can potentially provide health benefits to the organism in which they live - is one that can be traced back to the early 20th century. It was at this time that the Russian biologist Élie Metchnikoff observed longer lifespans in Bulgarians who consumed a fermented yoghurt drink compared with those who didn't. Since the birth of Metchnikoff's idea, research into probiotics has suggested that they may shorten the duration of diarrhoea episodes, decrease the severity of lactose intolerance, and temper high blood pressure. However, it is only relatively recently that scientists have turned their attention to another possible benefit of probiotics - consumption of these micro-organisms could potentially contribute to improved mental wellbeing. The term “psychobiotics” has been coined by Professor Ted Dinan, of the Alimentary Pharmabiotic Centre at University College Cork, Ireland, to describe probiotics whose health benefits are psychological.

Every year in the UK, one in four people will suffer from a mental health problem. However, for all the government's talk of equal regard to the importance of both mental and physical health, services for the former are woefully underfunded, meaning that many sufferers are not able to access treatments which could be helpful, such as cognitive behavioural therapy. Antidepressants, the most commonly prescribed of which are selective serotonin re-uptake inhibitors (SSRIs), can be of benefit, but only to some. And they are not without risk: as well as physical side effects including gastrointestinal problems and dizziness, there are concerns of a link between SSRI use and suicidal thoughts, particularly in young people. So an

alternative treatment - one that could possibly be incorporated into something as routine as one's diet - is surely to be welcomed.

The brain has a two-way relationship with the micro-organisms which live in the gut (referred to as the gut's microbiota). Studies have shown that rats subjected to stress in early life have altered microbiota. In the other direction, differing stress responses were observed in mice who were kept "germ-free" - that is, raised in environments where they were protected from micro-organisms - compared to those with ordinary gut microbiota. This relationship is extremely complex, and the mechanism behind it unclear. One suggestion is that it is driven by the vagus nerve, which connects the brain with the gut. Animal studies seem to back up this idea. When experimenters gave mice a certain strain of bacterium, the mice behaved less anxiously - but this effect was not observed in mice whose vagus nerve had been cut.

Research into the effect of probiotics on mental wellbeing in humans is still in its infancy, but early results are promising. The journal *Gut Pathogens* published a study in 2009 that indicated taking a strain of the bacterium *Lactobacillus casei* - found in Yakult drinks - led to decreased levels of anxiety in sufferers of chronic fatigue syndrome. A 2010 French study found that healthy adults who consumed a combination of bacteria, including a strain of *Lactobacillus helveticus* - a bacterium put to use in the production of certain cheeses - showed fewer depressive symptoms compared with those who took a placebo.

We should be cautiously optimistic about the possibility of using psychobiotics to treat psychiatric conditions, especially given the incomplete understanding of the mechanisms behind their effects, as well as the lack of research into effects on clinical populations. But if early, promising results withstand further, rigorous trials, psychobiotics could potentially be an effective approach to treating anxiety and moderate depression. Prescriptions for antidepressants are on the rise. Given pervasive doubts about their effectiveness and concerns about their side effects, it is not a moment too soon for the psychobiotic revolution.