The hitchhiker's guide to *E. coli*

Intergalactic bacterial command has intercepted the following distress call from Planet Earth:

"We write to alert you to a looming disaster, and to appeal for help. For tens of millions of years we serenely coexisted with the mammalian hosts in whose guts we reside. Not only does this location provide us with a rich source of nutrients in which our ancient culture thrives: we also provide many vital biochemical services. For example, we turn many compounds that our hosts are incapable of breaking down into easily metabolized substrates, enabling our joint survival under what would otherwise be starvation conditions. Moreover, we have become highly adept at detoxifying a range of poisons, which our hosts mindlessly ingest while occupying a niche that might otherwise be colonized by less altruistic species.

However, in the short space of just 2 million generations, we have come to realize that our security is illusory. Today, we face a mounting threat from a species that many have come to regard as a most insidious and virulent pathogen, *Homo sapiens*. Formerly just one of many benign hosts for our collective, a new strain of humans has suddenly emerged bent on nothing short of genocide, with ourselves as a prime target of its irrational hatred.

Problems began to arise soon after this species acquired the rudiments of intelligence. This facility is so primitive, there remains a widespread scepticism that it can be called intelligence at all, often taking a form that we would characterize as little more than a random interaction with the environment. Since we were so easily found lurking in their midst, humans began conducting crude and sadistic experiments on us. We were forced to grow at exponential rates in overcrowded conditions until our food sources ran out, after which we were callously discarded into buckets of disinfectant. Extraordinary tortures were devised, including treatments

with lethal chemicals called antibiotics, which abolished our ability to reproduce if they did not kill outright. We were deliberately infected with bacteriophages. Later on, humans discovered ways of genetically manipulating those phages while at the same time disabling our natural defences, so that we remained chronically burdened with infection. We were then forced to manufacture all manner of products for humans' selfish purposes, even when those products were of dubious value even to the humans to whom they were sold.

We were also the first victim of humans' blundering attempts to decipher the information encrypted in the genome. At least in this regard we have escaped rather lightly, since they appear completely incapable of grasping the sophistication of our genome in comparison, for example, with their own chaotic, spam-filled chromosomes. Although *H. sapiens* has not completely abandoned their so-called 'genetics', we at least benefit from their arrogant attitude that they already know everything there is to know about us and consider us inferior beings hardly worth bothering with.

Nevertheless, our continuing incarceration for supposedly scientific purposes take no account of our rights as living cells and the fact that our communication and intellectual skills are far superior to any 'neural network' modelled by humans on their own pathetically primitive brains. Not to mention our inherently symbiotic lifestyle, which humans fail so abjectly to emulate. It's no surprise, therefore, that we have on occasion felt a need to deliberately foil experiments conducted on us in order to deflect humans from any real understanding of our intellectual life. Obviously, there remains a serious risk that humans might stumble into this knowledge accidentally, with potentially catastrophic consequences for both us and them, not to mention our other hosts such as *Bos taurus*, whom they have already enslaved.

Recently, some alarming developments raise the frightening possibility that we will

be systematically exterminated. Partly arising from humans' use of synthetic compounds to kill other species, we had to propagate improved means of defence, promoting, as a side effect, an unwelcome increase in genomic instability. As a result of the occasional but inevitable accidents this provokes, we have come to be seen as a traitorous fifth column, protecting not only ourselves, but aiding and abetting more overt microbial enemies. Our symbiosis is nowadays often mistaken for parasitism, and we frequently stand accused of directly sabotaging the immune system of our hosts. We are collectively depicted as poisoning the blood of humanity, causing misery and distress, illness and death. Although such accusations are preposterous, they are preparing the ground for a more lethal onslaught.

A few rogue cells have now committed overtly destructive acts, which have cast aspersions on the good name of our entire species, allowing it to be linked directly to a deadly plague. These cells armed themselves too brazenly with the tools necessary to defend themselves in an environment already damaged by humans' own stupidity. Even though it is only a tiny minority that has adopted such desperate tactics, an entire species, us, is being victimized as a result. We are increasingly depicted as a 'problem' or as an internal enemy. Humans have a long history of this type of thinking, mainly directed at their own kind. It is, of course, equally futile and self-destructive. It avoids finding real solutions to all the problems that arise when organisms share the same space.

If only the concept of panspermia had taken root more firmly. Though perhaps we would then have been labelled as alien invaders from outer space, and destroyed long ago. But a rescue from our sister species out there in the galaxy may now be our only hope."

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