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An unusual and witty paper

Magical Microbial Moments

While the world focussed its attention on the Olympic Games in London, another competition was taking place off the beaten track: the Microbial Olympics. Fantastic athletes were ready to provide many magical moments to an enthusiastic audience. Unfortunately, the event attracted very little attention. Only one magazine reported on it.

Who won the sprint at the Olympics 2012 in Oxford? No, not Usain Bolt. You're at a loss? Well, perhaps you know who the gold medallists were in 100 μm freestyle swimming? A hot tip: read the question carefully. The correct answer is: *Rhodobacter sphaeroides*.

We are not joking! It was the editors of *Nature Reviews Microbiology*, who – in a witty moment – arranged the first Olympic competition for microbes. Sprint, Boxing, 100 μm Freestyle Swimming, Javelin, Relay, Diving and out-of-season-Winter Games were the biology-based, fictitious contests that were overseen by an international team of ten enthusiastic reporters, mostly scientists (*Nature Rev Microbiol*, 10:583-8).

Bacteriophage as the giant killer

As in real life, the use of banned means led to disqualification. Here's a short version of their reports. Medals were awarded in the following categories:

► The Sprint, in which the microorganism producing the most progeny at the finish line receives the award. Yeast was hopelessly slow, *Escherichia coli* the odds-on-favourite. But on the home straight, *E. coli* phages struck, just as the opponent was thought to be home and dry and the loudspeaker announced: "Gold to the phage".

► Boxing, where medals are awarded to the toughest guys; the top in biological warfare. It was a thrilling competition. Bacillus Bill and Salmonella Sam, two accomplished and enthusiastic reporters, commented. In the first semi-final *Pseudomonas* knocked

out *Deinococcus* with its toxins. In the second semi-final, Methicillin-resistant *Staphylococcus aureus* (MRSA) came away with the victory. Its inveterate foe *Neisseria* was disqualified for attacking opponents with a hook. In the final, an uphill struggle with super-antigens and biofilms as heavy armament, *Pseudomonas* seemed to have beaten MRSA. However, it had used a banned "performance-enhancing, small molecule" and was deprived of the victory. The gold medal went to happy MRSA.

► 100 Micrometer Freestyle Swimming, a real experiment with flagella-equipped microbes. The breathtaking race ended in a photo finish: *Rhodobacter sphaeroides* took the Olympic gold after 2.02 seconds, followed by a chimeric *E. coli* (2.08 sec.) and *Pseudomonas aeruginosa* (2.12 sec).

► Javelin, a competition searching for the pathogen able to secrete proteins or other effectors the farthest into a host cell. The athletes presented extraordinary, creative solutions. Not all were permitted: *Hep-taglossa mirabilis*, for example, was disqualified for using a gun (cell). In the end, *Puccinia monoica* won the gold medal.

► Relay, having human hosts at the starting line and determining those pathogens that can infect the most people along the track. In the race between *Yersinia pestis*, *Chlamydia trachomatis*, avian influenza virus H5N1 and the common cold rhinovirus, the latter took the gold medal. That virus combined easy infection and low morbidity in an almost perfect manner. The devastating *Yersinia* should reconsider its strate-

gy; otherwise it will never stand a chance of winning that competition.

► Diving, awarding medals to those microorganisms that could best dive synchronised. Again, *E. coli* was the favourite, diving down to a depth of 11 km with its human host. But the Olympic Committee gave the gold medal to *Photobacterium phosphoreum*, which dives with deep-sea fish, thereby illuminating the fishes light organs with perfectly synchronised fireworks. Live and let dive!

► Winter Games, especially for tiny creatures in icy environments, such as glaciers or ice sheets. In the three extreme disciplines: coldest temperatures for growth, protein synthesis and motility, the gammaproteobacterium *Colwellia psychrerythraea* strain 34 H was the unchallenged favourite and took the title, as expected. Never heard of that guy? No wonder, 34 H leads a reclusive life, far away in the Arctic and Antarctic sea ice. Brrrr...

A scientifically grounded gloss

In their fantastic fantasy article, the Olympics' reporters not only celebrate the successful microbes but also explain, which biological features enabled them to win the prestigious titles. With their paper on the inaugural Microbial Olympics, the editors of *Nature Reviews Microbiology* might have entered a new field of science reporting: a gloss built on a truly scientific basis.

What, on the other hand, was the authors' motivation to actually leave the field of traditional 'serious science reporting'?

Lab Times asked two of them, Antje Boetius, deep-sea expert from the Alfred Wegener Institute of Polar and Marine Research in Germany, and Stephen P. Diggle from the University of Nottingham, why they actually spent their precious time, reporting on these Olympic Games. They both answered via email – and we put together their answers in an *in vitro* interview.

Lab Times: Who came up with the idea for that fanciful story?

Antje Boetius: I was contacted by one of the editors of *Nature Reviews Microbiology*, if I would provide a short contribution to an article “The Microbial Olympics” to coincide with the 2012 Olympics in London. Myself and a couple of other authors were asked to identify three microbial competitors and award them bronze, silver and gold medals, just as in the real Olympic Games, as well as to provide some background on the organisms and the reason for nominating them. It was the editor’s special wish that I should take care of the “Diving” section, as I am a deep-sea microbiologist. I found the idea really great but also difficult. Diving microbes... what would that be? But thinking about it, I had some ideas and wrote the piece on a rainy Sunday afternoon, all in one go.

Stephen Diggle: My understanding is that the journal wanted to publish the article as it was relevant in an Olympic year. The journal set about the task of finding suitable authors to write short articles on specific Olympic events of their choosing. I imagine they did this by looking at what the authors worked on and targeted them. I was asked to write a short article on the ‘Relay’ event.

Do you know why the editors wanted to publish a “fun story”?

Boetius: I met the editor during a conference and asked him how they got that idea. And he told me that the editorial board came up with the idea to host, from time to time, some contributions outside of the usual, rather “dry” science writing. In any case, the journal is known for its great illustrations, so why not also try to use a more creative writing style?

How was the article written?

Boetius: The editors contacted a few microbiologists they knew from other articles or conferences, with the idea in mind that everyone could be creative and scientific at the same time. We did not know of each other, or which Olympic disciplines were invited altogether. When the article was put together by the editor, I liked it a lot; it was a lot of fun to read.

What’s the purpose of the article? Only to say, “Hey, science is so much fun”?

Diggle: My view is that it is a ‘fun’ article but one which is important and useful for a couple of reasons. Firstly, there is relevant science in all of the articles but each is written in an entertaining way that will be understood by a broad range of readers. Secondly, it’s important in that it might help to encourage younger researchers into the field of microbiology. It is an article that shows the amazing and interesting things that microbes do in an easily accessible way. Too

many people think of bacteria as solitary cells that divide every once in a while. Boring they are not!

Boetius: Actually, science is full of fun – and what is wrong with that? Making discoveries, exploring how Earth functions is an “Olympic feeling” and a lot of fun. But for various reasons, the culture of scientific writing has turned into a rather dry matter, at least in the natural sciences. Especially for educative purposes, it is a good idea

to change the context and bring scientific knowledge to everyday applications or situations. For example, we believe what we see and that is with our own eyes, on our own spatial and temporal scales. That is why microorganisms are so hard to understand for humans – they live on very different scales. If one makes up a story where microbes are

upscaled to “human dimensions”, such as in the Olympic article, it might give you a new angle, through which to study their behaviour and what we do or do not know about them. So, it can be both fun but also informative – and that was the purpose of the article.

Do you think, in general, that scientific publishing is too serious? Should research be promoted more often with such humorous pieces?

Diggle: The scientific literature does what it needs to do and, in general, does it well. It is important that articles are written in a clear, scientific manner and subject to peer review. Only then can other scientists trust the work that has been published, which then allows it to be properly built upon. However, there is certainly scope for journals to occasionally publish entertaining articles, as these allow scientists and journals to engage with the public and discuss their research. This is important and there are other ways this can be done. Many scientists are actively involved via public talks, websites and blogs.

Boetius: The global culture of natural science writing is to try to be as objective as possible, avoid jargon, avoid personal impressions and avoid drama. There is still a lot of creativity in how experiments are planned and observations are made – but it does not show in the style of writing. On the one hand, this helps scientific progress, for instance, to find new data and new knowledge very quickly in the text. On the other hand, it is often boring to read. The individual scientist is left without a personality in her/his conclusions and style. If one compares the science writing of the 18th and 19th century, the change in culture is obvious. So I, for my part, do like being challenged to write in different styles and I do like to read science conveyed in different, also personal styles and creative context.

Thank you for your time – perhaps we’ll meet in Rio 2016.

KARIN HOLLRICHER



“Bacteria are not boring”, finds rocking sociomicrobiologist Stephen Diggle.



“Science is full of fun,” says deep sea expert Antje Boetius.