Abstractions

SENIOR AUTHOR

For many years, microbiologist John Moore and his team have been investigating the mechanism that HIV uses to enter the cells it infects. Based at Cornell University in New York, Moore has been involved in publications that highlight the role of certain cell receptors in the process.

Using this knowledge, both his team and other groups have devised strategies to stop the virus from entering cells. But so far, most of these have proved to be too expensive for widespread use. On page 99 of this issue, Moore's team presents promising results for a protective vaginal microbicide, which potentially could be cheap enough to produce and distribute.

Because of this potential, Merck and Bristol-Myers Squibb will now be providing a licence to the International Partnership for Microbicides to turn the compound into a product that could reduce the spread of HIV. *Nature* caught up with Moore to find out about the discovery.

Why a vaginal microbicide instead of a vaccine?

In the absence of a viable vaccine, it's highly relevant to look at alternative strategies.

What is the significance of this paper?

We're not the first group to test a microbicide. The significance is not what's in the paper but what's going to happen next. The drug companies, the International Partnership for Microbicides and the US National Institutes of Health are all going to work together to try to make a practical product. The paper is the means to an end.

What is the clinical significance of your work?

Affordability is a relevant issue. There's no point in developing something that costs a hundred or a thousand times what people can afford — such as monoclonal antibodies that could protect from HIV, which we published, but I dropped because of the affordability issue. We're competing financially with the price of a condom; you have to be able to make a microbicide for tens of cents per use, not tens of dollars.

What were the authors' contributions?

Ron Veazey at the Tulane Primate Center did all the real work. Marty Springer of Merck and Richard Colonno at Bristol-Myers Squibb deserve credit for having the vision to see that their compounds could make a difference to public health. I further developed my typing skills.

What's next?

We're still working on identifying and developing new compounds. The companies are going to develop a product. I'm not going to be developing a product. I'm a basic-science guy. ■

MAKING THE PAPER

Alison Smith

From seaweed to a partnership between bacteria and algae.

For years, algae have puzzled researchers. Some species require vitamin B_{12} to live, others are perfectly happy without it — but the variation between, and even within, species seemed completely random. More to the point, it wasn't at all clear where the vitamin-dependent algae were getting their supplies from — were they making it themselves?

Alison Smith, a plant scientist at the University of Cambridge, UK, had long followed the debate, and discussed it with her colleague and frequent collaborator Martin Warren at the University of Kent. They knew that seaweed was often used by vegetarians as a vitamin B_{12} supplement.

"For a long time, Martin and I wondered whether seaweed makes vitamin B_{12}," Smith says. They both leaned towards the affirmative as algae are generally considered to be autotrophic; in other words, they can produce everything they need to sustain themselves.

To explore the idea, they set out to grow various algae in the lab. But they soon found that natural growth conditions were difficult to mimic, and their algae were quickly covered in bacteria. The pair wrote off the experiment as a failure.

A subsequent literature search showed up quite clearly the differences between various algae and their relationship with vitamin B_{12}. After a little digging, Smith and Warren found papers on 326 different algae — half of which required vitamin B_{12} and half of which didn't. "We realized that the whole algae kingdom had been sampled more or less," says Smith.

They returned to the lab, and looked at the genomic sequences of three types of algae — one that required vitamin B_{12} to live and two that didn't. The vitamin-B_{12}-dependent alga contained only one gene that matched any of the 19 known to be necessary for bacteria to make the vitamin. So they decided the vitamin B_{12} must be coming from somewhere else.

The hunt was on. First they examined the sea and pond water that algae live in, but to no avail. Then they remembered how difficult they'd found culturing algae in the lab. They realized that most researchers who had grown algae in the past either added bacteria to their culture or encouraged their growth along with the algae. They isolated and assayed the bacteria in question and found that, sure enough, they produced vitamin B_{12}.

Smith says that their findings point to the important of symbiosis — not just in algae, but in many organisms. "We've provided a very succinct piece of evidence that organisms don't live on their own," she says. Even humans require bacteria in the gut to thrive. Highlighting the relationship between algae and bacteria illustrates that simple organisms depend on each other, too.

Smith and Warren next want to examine the mechanism by which the algae get the vitamin from the bacteria and also what the bacteria get from the transaction. "Clearly they're getting something — we don't know what." That question gives Smith and Warren another algal puzzle to tackle. ■

QUANTIFIED **CANADA**

A numerical perspective on *Nature* authors.

Working at the University of Alberta in Canada offers Martyn Unsworth a good balance of teaching and research. With two to three classes a year, Unsworth enjoys the ongoing contact with his students, and has plenty of time left over for geophysical fieldwork. Unsworth says that the eight months he spent in Tibet, on four separate expeditions, were particularly challenging and rewarding. Working as part of an international team of scientists, he found the trips valuable from both a scientific and a cultural point of view.

On page 78 of this week's issue, Unsworth and his colleagues show that in major mountain belts such as the Himalayas, Earth's crust may be weak enough to flow horizontally, which would account for a number of geological observations made in the Himalayas and elsewhere.

117 contributing authors on *Nature* papers this year work in Canada (total number of contributing authors = 4,946).

3 authors working in Canada report original research in *Nature* this week.

8% of this year's contributing authors working in Canada are based at the University of Alberta.

36 original research submissions to *Nature* this year have come from the University of Alberta (total number of submissions = 11,561).