Abstractions

LAST AUTHOR

On 11 June, the World Health Organization declared that infections with the new H1N1 strain of influenza A virus had reached pandemic proportions. By then, a team of scientists in Japan and the United States had already begun characterizing the swine-origin virus from samples isolated from five patients in the United States, the Netherlands and Japan. On page 1021, they detail the virus's replicative efficiency as well as its sensitivity to antiviral drugs. Yoshihiro Kawaoka, a virologist at the University of Tokyo's Institute for Medical Science, shares what he learned from early clinical accounts of H1N1.

Could 2010 see a 1918-style pandemic?

It is a concern, but it is very difficult to say whether a 1918-type outbreak will occur. There are similarities to the 1918 strain — both infect cells deep inside the lungs. And our work shows that only people over 90 years old who were exposed to the 1918 influenza pandemic have antibodies to this H1N1 virus. There is a common misconception that people over the age of 60 who were exposed to other swine-flu outbreaks have antibodies, but our data do not support this.

What do clinicians need to know about this virus?

Clinicians need to understand the prevalence of this virus. Any patient presenting with symptoms of a respiratory infection should be tested for swine-origin influenza. I know of one instance in which H1N1 swine-origin influenza was not suspected when a patient presented to their doctor and the virus then spread to other family members. That incident demonstrates that physicians should be on high alert because of the importance of early treatment with antiviral drugs.

Will the available drugs help against H1N1?

Yes, our data show that existing and experimental antiviral drugs, including Tamiflu and Relenza, effectively treat these strains of H1N1. However, developing countries do not have enough of these drugs. And it seems unlikely that there will be enough vaccine to protect all susceptible people, even though drug companies are producing as much as possible.

What can the average person do to prevent illness?

The best thing to do is avoid crowds. The worry is that sustained transmission between humans could lead to a more harmful strain. Right now, most infected patients will have mild symptoms, but a few will have severe illness. Everyone — even young people — should see a physician when they have flu symptoms. ■

MAKING THE PAPER

Motoyuki Ashikari

Flood-survival genes surface after years of fieldwork in rice paddies.

When Motoyuki 'Moto' Ashikari comes into his laboratory in the evenings, staff at Nagoya University in Japan often mistake him for a student. Who else would be working late wearing shorts and muddy sandals? But if you want to hunt genes that can make rice a hardier crop, Ashikari says, the best place to be is under the Sun in a swampy rice paddy.

In this issue, Ashikari and his team explain how certain varieties of rice manage to keep their leaves above water in flooded fields. When a gas released by the plant builds up in the hollow, submerged stems of a 'deepwater' rice variety (*Oryza sativa* ssp. indica), the plant rapidly elongates. Ashikari and his colleagues had previously linked aspects of this response to a section of the rice chromosome 12. Now they have identified the genes that allow this rice plant to rocket upwards when submerged (see page 1026).

It took five years, Ashikari says, to produce sufficient crosses of deepwater and non-deepwater rice to pinpoint the key stretches of DNA, and the roots of the project go back even further. In 1998, Ashikari was working on his doctorate when the Japanese government launched the Rice Genome Research Program. Ashikari joined up because he thought that rice would make an interesting research model — unlike some other plant models, cultivated rice can crossbreed with its wild counterparts. "I thought wild rice might have many agriculturally important traits hidden in its genome," he recalls. He hoped to be able to restore some such traits to the higher-yielding crop varieties.

In general, traits are not controlled by single genes, but rather by the combined effects of a host of genes, each of which has more than one version. Identifying the stretches of DNA that bear the responsible genes — quantitative trait loci (QTL) — is a matter of statistics and breeding a vast number of plants. "Measurement is important," Ashikari says. "In the mapping of single mutant genes, the mutation is either there or it isn't, but QTL analysis is not so simple — it maps traits on a continuous spectrum."

Ultimately, Ashikari and his co-workers used tens of thousands of crosses to narrow down the genes responsible for flooding-induced elongation. Now, they reveal two genes that respond to the natural build-up of ethylene gas in stems that are trapped underwater. The genes' corresponding proteins launch a signalling cascade that causes the stems to shoot skywards.

The authors also bred the identified genes into non-deepwater rice and tested the new variety's growth in a slow flood. Recreating conditions in the lab that mimicked the monsoon-driven flooding common to many rice-growing regions was "laborious", Ashikari says. "It built muscles." His team transplanted plants from the field that had reached a height of 30–50 centimetres into 3,000-litre tanks, with only the top third of the plants above water. When the researchers raised the water level by 10 centimetres a day, plants with the deepwater QTL easily outgrew the rising waters. Those without them did not.

After all the work to identify these genes for flood-resistance, Ashikari needed to name them. He settled on *SNORKEL1* and *SNORKEL2*. The rice stem is, after all, a hollow tube that allows an organism to exchange gas while underwater. And, Ashikari notes, the word 'snorkel' sounds similar in English and Japanese. ■

FROM THE BLOGOSPHERE

Summarizing five years of research in five paragraphs or fewer is no easy task, finds Elizabeth Moritz, a doctoral student at the University of Illinois at Urbana–Champaign. In the latest instalment of her slightly tongue-in-cheek blog series "How to land a postdoc", Moritz explores the delicate balance of preparing a postdoc application when one's research is as yet incomplete.

"The challenge," Moritz writes on her Nature Network blog, PhD to be, "is to condense each of my projects into a neat paragraph of 4–6 sentences and come up with a snazzy graphic/table/chart to go with each," (http://tinyurl.com/ojxvf4).

Moritz seeks advice on age-old questions: how many labs do I apply to at once? What's the secret to an effective cover letter? But through social networking, Moritz has gained a broader perspective than she would had she simply polled her lab mates. Her musings have garnered eye-opening replies from different countries and disciplines, as well as from across the fence as professors share what catches their attention in an applicant. Drop in on the conversation and get some tips for your own postdoc application. ■

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