Elsevier has created a Monkeypox Information Center in response to the declared public health emergency of international concern, with free information in English on the monkeypox virus. The Monkeypox Information Center is hosted on Elsevier Connect, the company's public news and information website.

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Novel biosensors to probe for pathogens and toxicants

Micron-scale airborne probes and genetically engineered cells that emit fluorescent signals in the presence of toxicants were among the biodefence and disease-detection products discussed at the recent American Society for Microbiology's conference on bio, micro, and nanosystems in New York, USA. The 4-day conference (July 7–10), held in collaboration with the Institute of Electronics and Electrical Engineers (IEEE) Engineering in Medicine and Biology Society, highlighted ways in which microbiologists and engineers work together in the expanding field of nanotechnology.

John Manobianco of ENSCO, a signal-processing company in Cocoa Beach, Florida, USA, described his team's work on "dust-like particles" that could be used to detect biological and chemical agents released in the air. "Conventional wireless biosensors are attached to bridges and buildings and sense the environment there. But we're creating a delivery system that would allow sensors to be deployed in the air, where they would be suspended or float via some kind of buoyancy or aerodynamic control."

"They wouldn't be like the very expensive flying micro-vehicles that the defence department is using. Ours would be low-cost", he explained. The sensor-carrying particles would be shaped like dandelion or maple seeds so they could be rapidly dispersed but would be large enough to avoid being inadvertently inhaled by people or animals.

In another presentation, Shimshon Belkin of the Hebrew University of Jerusalem, Israel, reported on several microbial sensing systems he is developing using genetically modified bacteria, yeast, and human cells. One system is being tested as a "rapid warning device against deliberate or accidental" poisoning of the water supply. The cells are embedded in a dormant state into modular cavities in an electronic platform and give off luminescent signals—"a sign that they're not doing well"—in the presence of toxicants, he explained.

"No such device exists today", asserted Belkin. "Our whole-cell toxicity bioassay answers a simple question: can you drink the water or not?"

Marilynn Larkin

Monkeypox spreads as US public-health system plays catch-up

At the time of going to press, 81 cases (32 laboratory-confirmed) of monkeypox had been reported in the USA, a figure that is likely to increase, according to Michael Osterholm (University of Minnesota, Minneapolis, MN, USA). Unless all animal reservoirs are identified and efforts made to "contain monkeypox and, hopefully, eradicate it", he emphasises, "there is no reason why an agent like that could not become an endemic viral infection of rodents in the United States, which would be absolutely horrible".

Indeed, on July 3, the US Centers for Disease Control and Prevention (CDC) confirmed the presence of monkeypox virus in one Gambian giant rat, three dormice, and two rope squirrels that were part of an African rodent shipment from Ghana to the USA (http://www.cdc.gov/od/oc/media/pressrel/r030702.htm). The shipment is said to be the source of the US outbreak, which started with a little girl who presented at the Marshfield Clinic (Marshfield, WI, USA). "The whole thing was a big surprise. It was difficult with the few cases we had here to recognise that something was happening that involved multiple cities in multiple states", says Kurt Reed, director of Marshfield's clinical research centre. Days went by as Reed and his colleagues tried to identify the source of the girl's antibiotic-resistant infection, taking cultures and, after her mother also showed signs of illness, doing biopsies and electronic microscopy.

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A Gambian giant rat

"On June 3, we had the first indication that this was an orthopox virus. Then we heard about the Gambian rat, and things got very bizarre. That's when we finally considered that this could be an old-world virus that had somehow got into the USA", recalls Reed. "Things moved quickly from there, but it could have been figured out a lot faster if everyone had all the information up front. But we didn't. If we had known when we saw we had pox virus that there were other cases from similar exposures elsewhere, that would have prompted a public-health response."

And therein lies the rub, says Osterholm. "This is a big-picture issue now. It's not the initial hit of monkeypox or West Nile or whatever—it's the spread throughout the country", he asserts. "It's not just being able to respond initially to an outbreak, it's surveying and being sure we get it all. Monkeypox is like West Nile because we never did control it right at the beginning and now look what's happened."

The US public-health system—even with limited resources and near "burnout" as a result of the threats of bioterrorism—needs to embrace a new mindset, continues Osterholm. "We have been basing our public-health practices on the concept that the developed world dealt with the developed world, and the less developed world was just there. Now we have to think that any disease there can occur not just in travellers, but here. It's like the deer in the headlights—you're going to hit it. It's a matter now of whether you just forget about it or let it come through the windshield."

Marilynn Larkin