Annihilating Anthrax

NASA- and industry-sponsored research aimed at growing plants in space has led to a device that attacks and destroys airborne pathogens -- like Anthrax.

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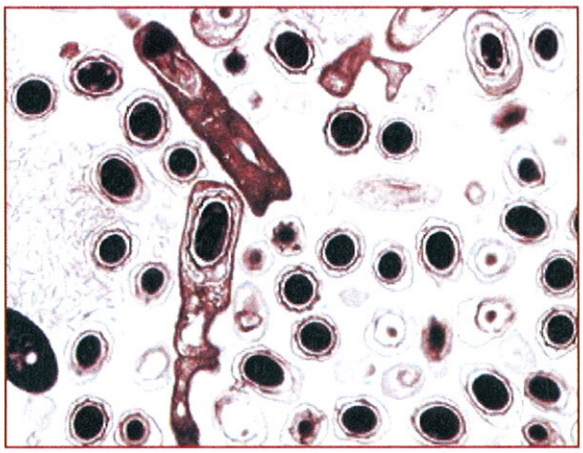

February 1, 2002: Unseen and odorless, a cloud of Anthrax spores wafts through an office. People inside are talking, laughing ... breathing. They have no idea something is in the air. One yawn, one gasp, one happy guffaw could be deadly.

That's how bioterrorism works.

But this office has a defense: Bolted to the ceiling is a curious flat box. It's made of metal, about the size of a table-top, and it's humming softly -- the sound of fans drawing airborne spores toward it and away from the people. The breeze is gentle but insistent. Eight cubic feet of air per minute flow into the box.

Above: Anthrax spores, pictured here in a thin section micrograph, are inactive forms of the bacterium *Bacillus anthracis*. Such bacteria can survive for decades inside a spore's tough protective coating; they become active when inhaled by humans. [more]

What lies inside is bad news for Anthrax. Swirling air forces spores through a bewildering maze of thin tubes bristling with hydroxyl (OH^-) ions that attack and destroy pathogens. Some spores are buffeted against the OH^--lined walls of the labyrinth. Others are caught in windy eddies where they linger, exposed to high-energy (254 nm) ultraviolet photons. Every second, one hundred billion such photons bathe the chamber -- and just one is enough to destroy a spore.

"Spores that pass through the box aren't filtered, they're fried," says John Hayman, whose company, KES Science & Technology, Inc., builds and sells the device called *AiroCide* TiO_2. "That's appealing," he notes, "for people who don't want to change an Anthrax-laden air filter." Tests show that as many as 93% of Anthrax spores that enter *AiroCide* TiO_2 are destroyed. Survivors circulate out of the chamber where they are likely to be sucked back in again for another pass.

Below: Technicians install *AiroCide* TiO_2 on the ceiling of an office.

This extraordinary Anthrax killer is a result of NASA- and industry-sponsored research aimed at building better greenhouses in space. "Greenhouses may seem to have little to do with the war against terror," says Mark Nall,