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How to survive a robot uprising

Will robots one day be able to infiltrate our society and control our decisions? A recent study shows that it's possible—for cockroaches, at least.

A group of European scientists, led by José Halloy of the Université Libre de Bruxelles (Belgium), demonstrated that when a group of cockroaches is given a choice between two identical shelters, the entire group will usually huddle under a single shelter. If one of the shelters is darker, cockroaches will choose it over the lighter shelter.

The team then introduced robots masquerading as cockroaches into the mix (*Science* **318**, 1155–1158; 2007). It was crucial for the cockroaches to accept each robot as one of their own, so the researchers wrapped the robots in filter paper that had been soaked in cockroach pheromones. The pheromones enabled robots to influence cockroaches, and robots were programmed to be influenced by cockroaches in their immediate surroundings.

When robots were programmed to prefer light shelters over dark, they often managed to reverse the preference of the entire group and led the cockroaches to gather under the lighter shelter. Approximately 30% of the time, however, robots succumbed to peer pressure and joined the rest of the group under the darker shelter.

A drug for a longer (and happier) life

A search for the proverbial fountain of youth is turning up results. Linda B. Buck and colleagues at the Fred Hutchinson Cancer Research Center (Seattle, WA) tested 88,000 compounds on *Caenorhabditis elegans* nematodes and found 115 that seemed to increase worms' lifespan.

In follow-up studies the researchers found additional effective compounds. One drug, mianserin, which is used as an antidepressant in humans, extended nematode lifespan from three weeks to four (*Nature* **450**, 553–557; 2007). Mianserin is an antagonist to serotonin receptors, and its anti-aging qualities seem to be related to this effect; the drug did not increase the lifespan of nematodes that were engineered not to produce serotonin.

Previous studies have shown that caloric restriction can substantially increase the lifespan of many organisms, including yeast, flies and mammals. Mianserin seems to affect the same aging mechanisms that dietary restriction does: when the researchers put worms on a diet and administered the drug, they did not observe any additional benefit. The team speculates that mianserin might create a perceived state of starvation that would activate mechanisms of lifespan extension, even if the animal's food intake is adequate.

Looking to mice to treat multiple myeloma

A new device that allows scientists to better monitor cells in the bloodstream of mice may aid the discovery of new drugs to combat multiple myeloma in humans. Charles Lin and colleagues at the Wellman Center for Photomedicine (Boston, MA) developed the device, called a retinal flow cytometer.

In vivo flow cytometry (IVFC) is a technique for continuously detecting and counting fluorescently labeled cells in arterial circulation without the need to draw blood samples. Originally, IVFC monitored the blood in one vessel in the mouse ear, but the small sample size limits the sensitivity of the technique. Now, Lin's group has developed a new version that monitors blood flow in five artery-vein pairs in the mouse retina. The retinal flow cytometer detects about five times more cells per minute than did the original ear version (*Optics Lett.* **32**, 3450–3452; 2007).

The increased sensitivity is important in multiple myeloma because the fraction of cancer cells in the bloodstream can be very small. The new device can allow researchers to evaluate the effects of various experimental drugs in mice with multiple myeloma. Results from mouse studies may eventually lead to clinical trials in humans and development of new treatment strategies for multiple myeloma.