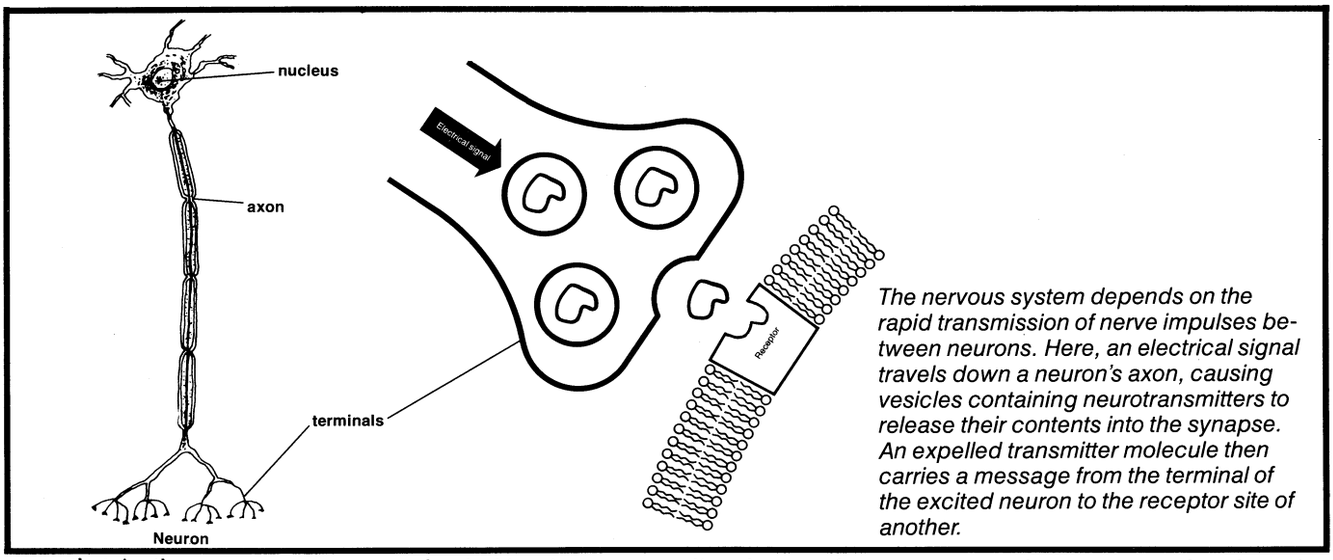

The nervous system depends on the rapid transmission of nerve impulses between neurons. Here, an electrical signal travels down a neuron's axon, causing vesicles containing neurotransmitters to release their contents into the synapse. An expelled transmitter molecule then carries a message from the terminal of the excited neuron to the receptor site of another.

says that in theory, as soon as normal pressure is obtained the firing frequencies will change so that the neurons become insensitive to additional tyrosine.

By exploiting the selectivity afforded by the brain's control over the sensitivity and firing frequency of some neurons, researchers may be able to use nutrients in the treatment of many disorders in addition to blood pressure abnormalities. For example, clinicians have used choline in the experimental treatment of tardive dyskinesia, a motor disturbance often brought on by the imprecise actions of antipsychotic drugs (which aim to block dopamine receptors, but inadvertently inhibit the release of acetylcholine in some regions of the brain).

Because nutrients seem to act so precisely and are so easily metabolized, they make an attractive option for a remarkably broad range of disorders. In addition to the studies already mentioned, scientists are considering the use of tyrosine in the treatment of stress, tryptophan for pain and choline for Parkinson's disease.

"It [precursor treatment] has great appeal," says Growdon, "because it is using the body's own mechanisms, but you're making it work in your favor...and it's unlikely to have toxic side effects or long term deleterious effects that some synthetic drugs have."

Growdon adds: "The potential utility of dietary precursor treatment is quite open." □

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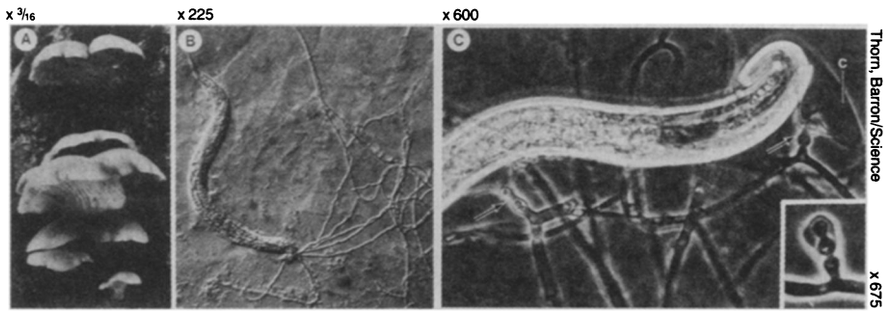
Attack of the worm-eating mushrooms



Diverse ways to snare a nematode: The oyster mushroom grows on a living tree (A). A small piece of this fungus, put on a laboratory gel, releases a potent toxin, which immobilizes a nematode (B). Filaments of the mushroom converge on the unlucky nematode's mouth. Another fungus, called Hohenbuehelia *(C), traps nematodes with its adhesive spheres (marked with arrows and magnified in inset). The nematode's struggles pulled its cuticle (c) away from its body.*

Mushrooms growing on rotting wood can supplement their carbohydrate diets with high-protein snacks of microscopic animals. At least eleven species of gilled fungi attack and consume tiny worms called nematodes, report biologists at the University of Guelph in Ontario, Canada. Some of the fungi use sticky protuberances to catch these refreshments. But the oyster mushroom and four related fungi employ a more unusual strategy. They release a potent toxin that stops nematodes in their tracks.

The taste for meat is widespread outside the animal kingdom among organisms that grow in nitrogen-poor conditions such as swamps, bogs or decaying wood. Approximately 450 species of flowering plants digest small-animal prey. In addition, many types of microscopic, asexual fungi parasitize nematodes or other microscopic animals.

Carnivorous consumption has now been reported among the types of fungi noticeable to a hiker in the woods. "These fruiting bodies are massive, bigger than your hand," says George L. Barron of Guelph. The oyster mushroom, an edible species, and its kin are most commonly found around the world on live and recently dead hardwood trees. They are grown commercially in Europe, Israel, Asia and the United States.

Fragments of oyster mushrooms, transferred to a laboratory gel and allowed to spread filaments into a thin weave, rapidly inactivate but do not kill nematodes. "Some knock out a nematode in half a minute," Barron says. "We have no idea what the toxin is."

After the nematode is inactivated, fungal filaments called hyphae grow rapidly toward and eventually penetrate a body orifice. Within a day the nematode body is filled with hyphae and its contents digested. "This method of attacking nematodes has not been reported previously," Barron and R. G. Thorn say in the April 6 SCIENCE.

Other mushrooms examined by Thorn and Barron immobilize nematodes on adhesive knobs and some nematode-trapping microscopic fungi also use adhesive cells.

How often are nematodes on the menu? A sample of a standing maple's rotting core produced more than 900 nematodes per 100 milliliters. "Nematodes are only 200 to 1,000 microns long, but if you can catch a lot of them, that's OK. They're very high in protein," Barron says.

The scientists conclude, "In habitats such as rotting wood where nitrogen is limiting because of scarcity or intense microbial competition, the ability of fungi to feed on nematodes may be a significant advantage." — *J.A. Miller*