BIOLOGY IN ENGLISH

Enzyme inhibitors can spell death

Cyanide gas was formerly used to execute people. Cyanide can be fatal because it binds to a mitochondrial enzyme necessary for the production of ATP. *MPTP* (1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine) is another enzyme inhibitor that stops mitochondria from producing ATP.

The toxic nature of MPTP was discovered in the early 1980s, when a group of intravenous drug users in California suddenly developed symptoms of Parkinson disease, including uncontrollable tremors and rigidity. All of the drug users had injected a synthetic form of heroin that had been contaminated with MPTP. Parkinson disease is characterized by the death of brain cells, that are also destroyed by MPTP.

Sarin is a chemical that inhibits an enzyme at neuromuscular junctions, where nerves stimulate muscles. When the enzyme is inhibited, the signal for muscle contraction cannot be turned off, so the muscles are unable to relax and become paralyzed. Sarin can be fatal if the muscles responsible for breathing become paralyzed.

A fungus that contaminates and causes spoilage of sweet clover produces a chemical called *warfarin*. Cattle that eat the spoiled feed die from internal bleeding because warfarin inhibits a crucial enzyme for blood clotting. Today, warfarin is widely used as a rat poison. Unfortunately, it is not uncommon for warfarin to be mistakenly eaten by other animals and even by children, with tragic results. A medicine called *Coumadin*, which prevents inappropriate blood clotting, contains a nonlethal dose of warfarin.

ANSWER

Can you explain why some people exposed to sarin may survive?