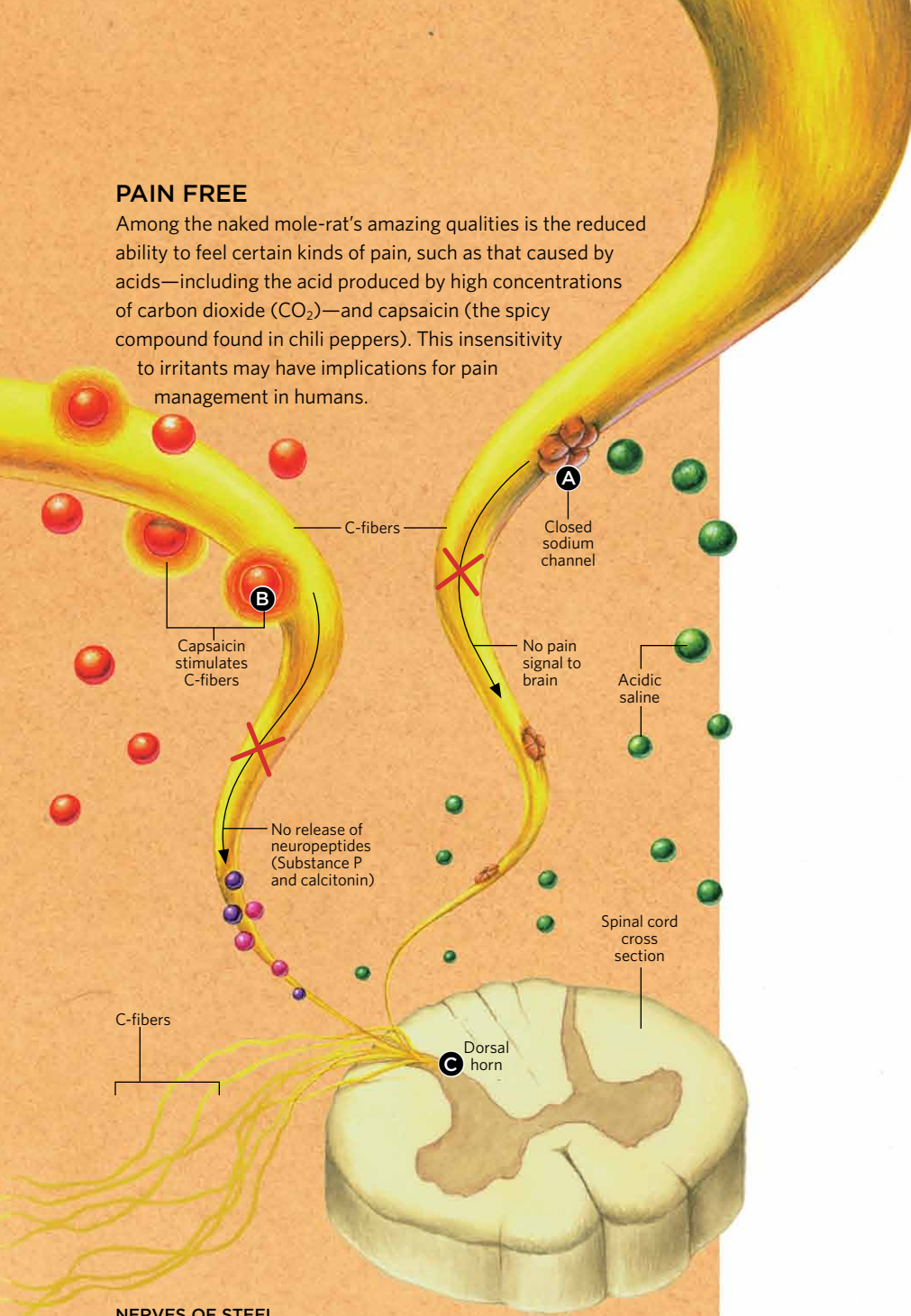


PAIN FREE

Among the naked mole-rat's amazing qualities is the reduced ability to feel certain kinds of pain, such as that caused by acids—including the acid produced by high concentrations of carbon dioxide (CO₂)—and capsaicin (the spicy compound found in chili peppers). This insensitivity to irritants may have implications for pain management in humans.



NERVES OF STEEL

A One reason naked mole-rats are insensitive to pain is the abnormal activity of their C-fibers, nerves that normally respond to high levels of CO₂ and other chemical irritants, and that underlie chronic pain following injury in humans. For example, a mutation in the C-fibers' voltage-gated sodium channels that causes them to shut down under acidic conditions makes the fibers completely unresponsive to acidic saline.

B Interestingly, C-fibers in naked mole-rats' eyes, nose, and skin do respond to capsaicin, but they lack the neuropeptides that are normally released onto targets in the central nervous system to convey a stinging or burning sensation.

C Another interesting difference between the C-fibers of mole-rats and those of their rodent cousins is their connectivity in the spinal cord. While other animals' C-fibers terminate at the outer edge of the spinal cord, many of those in naked mole-rats penetrate into the deep dorsal horn of the spinal cord.