Naked mole-rats have an unusual lifestyle in that they combine a fully subterranean existence, extreme sociality, and a proclivity for living in large numbers. Spending their entire lives in crowded burrows where many individuals share a limited air supply, these animals have evolved an unusual resilience to the challenges of breathing exceptionally low levels of oxygen and exceptionally high levels of carbon dioxide. Our studies have revealed numerous extraordinary features of naked mole-rat neurobiology that are hypothesized to be adaptations for living under these challenges. Some of these features protect the brain from low O2, while others promote peripheral nerve insensitivity to CO2-induced acidosis.