Big Animals, Slower Reflexes

It takes an elephant much longer to notice a fly and flick it away than it takes a shrew, and the reason is not that the elephant’s great brain is too busy with philosophy, or that it simply does not concern itself with flies.

It’s a matter of round-trip travel time — in the nervous system. The trip from the elephant’s skin to the brain and back again to the muscles to flick the tail is 100 times as long as the same trip in a shrew, according to a new study published in the Proceedings of the Royal Society B.

The nervous system acts like an information superhighway, sending messages back and forth from the brain throughout the body. The bigger the animal, the greater the distance traveled.

Nerves have a maximum speed limit of about 180 feet per second, said Maxwell Donelan, the study’s lead author.

“It makes sense that in a large animal, like an elephant, messages have a longer way to travel,” he said.

Dr. Donelan believes that large animals may have to compensate for this handicap by thinking ahead, and avoiding risky situations. “That’s what we want to study next,” he said. “It could be that the nervous systems of large animals have evolved to become excellent predictive machines.”

To conduct the study, the researchers rapped on the tendons of an elephant and a shrew, using electrodes to measure the exact time difference between the moment the animal was hit to the moment it reacted.