

By: ~~October 2007~~, Science Editor

Why Do Echidnas Have Four-Headed Penises?

A reptilian type of ejaculation

There may be animals with double penises (like lizards, snakes or sharks) out there, others to possess a double-headed penis (like marsupials), but echidna is unique: it has a four-headed penis! Scientists have been puzzled by this odd anatomy. Echidna does not even use its penis for urination and it gets it out of the body only in erection. When resting, the penis is kept inside a cloaca. Echidna and its relative, the platypus, form the group of monotremes, the most primitive mammals still living, and displaying many archaic traits inherited from mammals' reptile ancestor like this cloaca (just like in birds and reptiles), egg laying, weak ability to maintain constant body temperature (which is anyhow lower than in other mammals, at about 32o C, compared to 37o C in humans), tiny brain and many bone characteristics (especially in the ear, jaw and shoulder). Monotremes are living fossils, a link between mammal and reptiles. Echidnas are also called spiny anteaters, but besides the fact they are indeed spiny, as their sole defense against predators, they have nothing to do with the real anteaters of tropical Americas (except the fact that they are mammals, too, and ingest ants or termites). Now the mystery of the four-headed penis has been solved, revealing another reptilian trait: male echidnas ejaculate with just two heads (half of the penis) at a time. This resembles very much the way lizards and snakes ejaculate: they have a double penis (named hemipenis), but only one of the two penises is used during the copulation, while the other will effectuate the next copulation/ejaculation. Marsupials (another primitive group of mammals) are now in this matter something between monotremes and placental (evolved) mammals: they do not use half of the penis for mating, but still have a double headed penis, while the echidnas have a reptilian joined hemipenis, with each part of the penis in a marsupial-like fashion. Echidnas live only in Australia and New Guinea, but they are extremely shy in the wild and tricky to observe, while captivity breeding is unknown. This explains why scientists have not known how the four-headed penis functions. The solution was offered by a "horny" echidna male from a zoo which got an erection when presented during shows for the public. A team led by Steve Johnston of the University of Queensland in Gatton, Australia, filmed this animal, describing for the first time erection and ejaculation behavior in a monotreme. "When we tried to collect semen by [electrically-stimulated ejaculation] before, not only did we not get a single drop, but the whole penis swelled up to a four-headed monster that wouldn't fit the female reproductive tract, which has only two branches. Now we know that during a normal erection, two heads get shut down and the other two fit," Johnston told New Scientist. The sense of the one-sided ejaculation is still a debate even in the case of the reptiles, but the most plausible solution is the sperm competition, when a female is extremely promiscuous, mating with several males. Garter snakes or anacondas form mating piles made of one female and tens of males, each one mating with her. A female echidna can be followed by up to 11 males, which will do their job. In 1980s, Russell Jones from the University of Newcastle in New South Wales first discovered sperm bundles, made of hundreds of sperm cells, when he investigated a dead echidna. The bundles are found in other mammals too (like rodent species) and increase the travel speed of the sperm. This is no doubt sperm competition, as in rodents, the bundle growth was correlated to the promiscuity level of the female rodent in various species. "We can now study echidna sperm much better, which should offer fascinating insights into the evolution of mammals", said Jones.