

## Quick guide

# Male pregnancy

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**Don't try this at home!** Male pregnancy is an alien concept to us mammals. Yet this phenomenon is the universal reproductive mode of pipefishes, seahorses and sea dragons (family Syngnathidae, with more than 200 species). During mating, a female uses an ovipositor to transfer dozens or hundreds of her unfertilized eggs to the underside of a male, where he fertilizes them. Dad then carries his developing offspring for several weeks until they are born as tiny, independent young. The enclosed brood sacs of most syngnathid species are reminiscent of female kangaroos' pouches, except that these fish pouches are male contraptions.

**Is it really 'pregnancy'?** During a mammalian pregnancy, the placenta allows mom to nourish her progeny in the womb, and remove their waste products. If male pipefishes and seahorses merely provided a bag for fish eggs to develop and hatch, it might not fully qualify as bona-fide pregnancy. However, current research suggests that in syngnathid species with well developed brood pouches, males do provide nutrients, osmoregulation and oxygenation to the embryos they carry.

**The good news...** From a dad's perspective, one favorable feature of male pregnancy is his complete confidence of paternity: a pregnant male can rest assured that he is the true biological sire of offspring in his pouch. This contrasts with the situation in many fish species where males care for offspring (typically in nests) following external fertilization of eggs. In such situations, the resident or 'bourgeois' male sometimes gets cuckolded when a sneaker male

darts into his nest and releases sperm during a spawning event, thereby 'stealing' some fertilizations and making the bourgeois male a foster parent to some of the kids he raises. Male pregnancy offers a solid defense against this cuckolding strategy by sneaker males.

**The ultimate in women's lib?** Yes... and no. Although it is true that male pregnancy relieves a female from the burden of caring for her offspring, she still must provide the nutrients that are packaged in eggs. Thus, female pipefish invest more in offspring than deadbeat dads in female-pregnant species. However, in the spirit of irresponsible males, female pipefish usually leave their mates after mating, perhaps never to see them again. In monogamous seahorses, by contrast, a female remains 'married' to her mate and checks on him frequently. By so doing, she can be prepared with a new batch of eggs as soon as her husband gives birth.

**A pregnant pause...** During pregnancy, a male is temporarily out of circulation in the mating game. When most males in a population are pregnant, a female can have a hard time finding a repository for her eggs. In some pipefish species, this results in intense competition among females for the few available empty males. In turn, such competition has resulted in the evolution of secondary sexual characters, like lovely body stripes, in females. This is a remarkable reversal of the usual course of evolution wherein males are often under strong sexual selection for body adornments, like a peacock's showy tail.

**Splitting species...** Male pregnancy and sex-role reversal are more than just scientific curiosities: they provide valuable testing ground for theories about mating systems and sexual selection. Male pregnancy may even facilitate the creation of new species. Seahorses are monogamous, so the best option

for each individual is to find a mate of similar size to itself. Otherwise, dad's pouch would either be too small to hold all of mom's eggs or too big for her to fill. This situation favors size-assortative mating, which recent research suggests can contribute to reproductive isolation between groups of individuals differing in size, thereby predisposing seahorses to form new species quickly.

**Who else does it?** Pipefishes and seahorses are the only species to which the term male pregnancy has been applied. Although paternal care is fairly common in the animal world, few if any species have taken it to the outrageous extremes seen in Syngnathidae. Males may carry fertilized eggs on their bodies, as in giant water bugs and midwife toads, or they may defend nests or carry offspring in their mouths, as in many fishes. In a few bird species, males bear the sole responsibility for incubating eggs. But as many women readers will attest, even these exceptional instances of fatherly devotion pale in comparison to the burden of full-blown internal pregnancy.

### Where can I find out more?

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