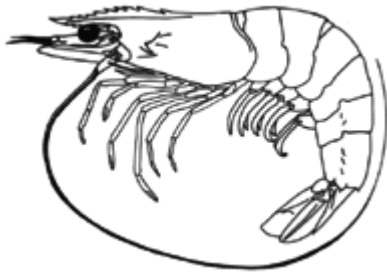


Where is a crustacean's brain?

The 'brain' of a lobster, crayfish, crab, prawn, shrimp or pill bug is at the front of the animal, between the eyes. It is small and white, even when the animal is cooked, and you have to dissect the animal very carefully to find it.



A prawn

Illustrator: Jo Taylor, Source: Museum Victoria

But a crustacean's 'brain' is not a brain in a human sense, because the crustacean's whole nervous system is organised differently to ours. Our brain is the central control point. All our thinking is done inside our skull, and messages from our brain are relayed down the main nerve cord inside the backbone. Crustaceans don't rely on their brain to control everything, like humans do. Instead, they have a small brain behind their eyes and a series of 'mini brains' or 'ganglia' (the plural of ganglion) in the nerve cord that runs along the body on the ventral (underneath) side.

The bodies of crustaceans are divided neatly into segments, and there is one ganglion per segment. Each ganglion receives sensory and movement information via nerves coming from the muscles, the body wall, and appendages such as walking legs, swimmerets and mouthparts. When this information reaches the ganglion it is processed on the spot, enabling a faster response than if the message had to travel all the way up to the brain and back.

Information can also be exchanged between ganglia so that coordinated movements can occur. This arrangement of the nervous system in crustaceans allows them to perform a range of complex movements. Crustaceans can swim well, forage for food, duck for cover if threatened by a predator, and perform an aggressive display to threaten another animal. Of all these movements, the one that best utilises the crustacean nervous system is the escape tailflip. In this movement the animal springs away from danger by rapidly flexing the middle of the body. This is a stereotyped movement, that is, it looks the same each time it is performed. The speed of the tailflip response probably saves many a crustacean's exoskeleton!

The 'brain' itself receives sensory information from the eyes and from the myriad of small receptors on the head and antennae – mechanical receptors that sense vibrations and small water movements, and olfactory receptors that detect chemicals in the animal's surroundings.