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THE PUZ PLA

IN BIOLOGY, a chimera is an organism that has a mixture of genetically different tissues, formed by processes such as fusion of early embryos or grafting (in plants). The term is derived from Greek mythology; the monster of that name had a lion's head and body, a goat's head protruding from its back, and a serpent-like tail ending with a snake's head. There is one creature in existence often referred to as chimeric. This is due to its mix of body features, and even genes, that seemingly belong to different parts of the animal kingdom. These have consistently confounded the evolutionary idea of common descent, and instead reflect common design.

The word *platypus* comes from Greek for 'flat-foot'. Its official genus name *Ornithorhynchus* is more logical—Greek for 'bird-bill'. It is found in Eastern Australia (including Tasmania) and is an Australian cultural icon. The male can grow up to 63 cm (25 in) in length and weigh up to 3 kg (6.6 lb).[1] The platypus has a duck-like bill, webbed feet like an otter, and a flat tail like a beaver. The male can inject a reptile-like venom, the female lays reptile-like eggs but nurses its undeveloped young like a marsupial (though not in a pouch). It also has the fur of a mammal, and the milk glands of a mammal, though without nipples. The platypus also shares some genetic elements with reptiles, birds, mammals, and marsupials.[2]

European naturalists were baffled when they were initially sent a skin and illustrations of the platypus. They thought this strange animal might be a hoax.[3] Further accounts soon proved the puzzling animal was no fake. Yet the perplexity didn't stop there. It challenged the prevailing definition of a mammal, as it doesn't give birth to live young, but instead lays eggs. Ultimately it was placed in a new order, Monotremata. This name comes from the Greek for "one hole", i.e., its cloaca (single opening for its urinary, digestive, and reproductive tracts). Monotremes are classified as egg-laying mammals that produce milk for their young. The only other living monotremes are the four species of echidnas (aka spiny anteaters).

Waterproof fur that glows

Platypus fur is usually dark brown on top, creamy white underneath, with two small light patches near the eyes. However, there have been examples of completely white platypuses.[4] Some are albino (no melanin produced at all and the eyes are red) and some leucistic (the mutation affects development or distribution of melanin cells), with a black bill and feet.[5] And if the platypus wasn't already unusual enough, it is now known that the fur is also biofluorescent. It glows green and blue under ultraviolet light.[6]

There are two layers of fur—an extremely dense undercoat, with up to 900 individual hairs per mm^2 (580,000

per sq. inch) and a coarser overlaying of guard hairs.[7] These layers work together to trap air next to the platypus's skin, keeping most of the body dry when in water. The insulation provided by the fur and trapped air is comparable to a 3 mm (1/8 inch) layer of neoprene wetsuit material.[7] This is important since the body temperature of the platypus is close to 32ºC (89.6ºF), lower than that of most other mammals. This lower temperature helps the platypus conserve energy when swimming in cold water.[7]

Additionally, there is a network of small veins and arteries in the pelvic area, known as a *rete mirabile* (Latin: 'wonderful net'). This provides an internal heat exchange system. Cooled blood returning to the heart from the legs and tail absorbs warmth from blood being pumped from the heart to the legs and tail. This helps retain heat inside the body and maintain body temperature.[7]

Loving that water life

Platypuses mainly sleep in earthen burrows at or near the water's edge. The webbing on their front feet forms a large flap or paddle that extends past the claws. This front foot webbing is the means of propulsion, pulling the platypus through the water. The rear feet are less extensively webbed, and are used to change direction, along with the tail, which also assists stabilization. When out of the water, the webbed paddles fold neatly under the front feet. This allows it to walk more easily, or to dig using its sturdy front claws.

The platypus needs to eat up to 21% of its body weight in food each day.[8] It spends from 8 to 16 hours a day foraging in the water, making up to 1,600 dives, each usually less than a minute.[9]

When eyes and ears won't do

When underwater, the platypus closes its eyes by way of a muscular groove pinching shut. This also shuts its ear openings, very close to the eyes, so water can't enter.[10] Its nostrils are similarly sealed shut.[11] Unable to use these senses, how does the platypus find food such as worms, insect larvae, and freshwater crustaceans?

One way is through electric sensing. Unlike a duck bill, the platypus bill is pliable around the edges. It is covered top and bottom with some 40,000 specialized skin cells. These are like modified excretory glands, of two types (mucous and serous). They contain electroreceptors, capable of detecting electrical fields as low as 20 microvolts (μV) per cm.[12,13] The electroreceptors can detect both alternating current (AC) and direct current (DC).[14]

Platypus: © Pjglbson | Dreamstime.com

Ducks: © Sonsedskaya | Dreamstime.com Duck feet: © Vasyl Helevachuk | Dreamstime.com Beaver: © Injhuz | Dreamstime.com

In addition, there are about 60,000 specially designed mechanoreceptors[11] on the bill surface. These can detect movement as minute as 20 microns (0.02 mm or 0.0008 in). Separate rows of electrical and mechanical sensing cells run in rows along the length of the bill alternating with each other.[14]

When hunting, the platypus moves its bill back and forth as it swims along a river or streambed, searching for the electrical signals and the faintest movements of its prey. Nerve cells transmit signals from these two detection systems to the brain. The neighbouring receptors of each of these two systems are connected to the same nerve cells. So the information each provides is rapidly integrated to allow the direction and distance of a food source to be calculated.[13]

Electroreception is being investigated as a potential means to improve electrical impedance tomography, a way of producing images of body tissues which, unlike X-rays, is radiation-free.[13,15] Additionally, it may improve medical sensors that can detect and analyze electrical signals. These are used in wearable electronics—devices and clothing that can measure vital signs to monitor health and fitness.[13]

The sting in the … spur

Adult male platypuses can inject a powerful venom from a spur on each hind foot, 15–18 mm (0.6–0.71 in) long. While not life-threatening to people, it does result in excruciating pain and swelling which can last several weeks. Some local swelling and muscle wasting (likely from the temporary impairment of movement, rather than directly from the venom) may persist for months. Because venom production rises during breeding season, it is thought to possibly be used to assert dominance over other males. It may also function as a defence mechanism.[16]

The venom is known to consist of at least nineteen classes of peptides (short proteins). Five of these are unique to the platypus, but in other respects the venom is similar to that of snakes and other reptiles.[17] The path monotreme evolution is supposed to have followed means the similarity could not have been inherited from a common ancestor. So, evolutionists must regard the venom as having arisen independently in both reptiles and monotremes—'convergent evolution'.[18] The same explanation is required for some other similarities with the platypus, e.g., the electrosensing in some fish and amphibians.[14]

Platypus evolution?

But the evidence for any kind of platypus evolution is weak, at best (see 'Fossils and the platypus', opposite). It makes more sense that the Master Designer utilized common design with purpose in His creations.[19] Researchers think further studies of platypus venom might lead to novel pharmaceuticals of benefit to humanity.[16]

Considering the platypus with a biblical worldview, we see an animal that has always been one created kind, with variation. The kind (or baramin) might have been at the family level, making the echidna a separate kind. It is possible however, even likely, that the original platypus pair on the Ark, besides being generally more robust than today's platypus, had teeth which persisted in the adult. Today's platypus is then the more specialized descendant of this pair. Such a process involves a 'thinning out' of the genetic information, with less potential for further change.

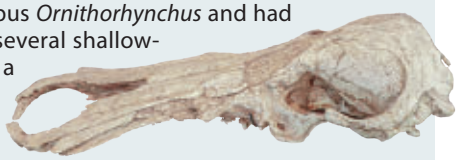
Conclusion

While the platypus appears something of an oddity, it is certainly no chimera. Its unique combination of features provides further evidence for the intelligent, purposeful design in all of God's creation. Finding these features together in one

creature highlights something very different to 'convergent evolution'. It displays the Master Designer exercising His prerogative to use design principles shared across different groups. And to do so in whatever combination He chooses, whether or not it fits readily within any evolutionary narrative. ■

FOSSILS AND THE PLATYPUS

The oldest discovered fossil of the modern platypus is said to date back about 100,000 years. A complete fossilized skull containing some teeth was found in the Riversleigh world heritage area of northern Australia, 'dated' at 10–15 million years (Ma). Along with a few other unassociated individual teeth and lower jaw fragments from the same deposit, it was ascribed to the extinct genus *Obdurodon*.[20] This genus was larger than the modern platypus *Ornithorhynchus* and had adult teeth. Today, *Ornithorhynchus* has several shallow-rooted pre-molar and molar teeth as a juvenile. But these fall out once it starts eating solid food, and are replaced by rough grinding pads called ceratodontes. These grow continuously to offset natural wear.[8]



A few fossilized *Obdurodon*-like teeth, though substantially larger, were found in 1992 in South America (Patagonia, Argentina). Supposedly 61–63 Ma old, they were the first evidence of a monotreme outside of Australia. Despite the paucity of this evidence, the teeth were given their own genus and species name, *Monotrematum sudamericanum*.

Then in 2023, another Patagonian fossil caused evolutionary excitement. It was a single tooth, attached to a small fragment of lower jawbone. The tooth was also like those of the Australian *Obdurodon* but midway in size between it and the previous Argentinian find. The fossil evidence in both South American finds was minuscule, and there are only the subtlest of differences between their tooth anatomy. But this one was '70 Ma old', so with 'millions of years' separating them, it was not surprising that evolution-believers gave it, too, a unique classification, *Patagorhynchus pascuali*.

Evolutionists generally believe monotremes arose in Australia. One of the reasons is the 1999 description of a single tooth, with a lower jaw fragment attached, from southeastern Victoria, Australia. 'Dated' at 121–128 Ma, it seems to have belonged to a tiny shrew-like creature dubbed *Teinolophos trusleri*. Apart from three other jaw fragments in the same deposit, no other fossil evidence of this creature, which has some features suggestive of a monotreme, is known.

Before that, in 1985, a single opalized lower jaw fragment with three molar teeth was found at Lightning Ridge, New South Wales, Australia. 'Dated' at some 100–110 Ma, it, too, was given a unique genus and species name, *Steropodon galmani*. It is described as platypus-like in some respects, and has been seized upon as an evolutionary ancestor. Sketches (e.g., at left) show it as transitional between today's platypus and an assumed even earlier ancestor. Yet this image is based only on rather fragmentary evidence, and clearly drawn with an evolutionary narrative in mind.

To show how flexible the evolutionary framework is, when the 1992 *Monotrematum* had just been found with its much larger and more robust dental anatomy, an expert on Australian fossils described the modern platypus in comparison to its presumed ancestor as "an extremely degenerate and small animal".[21] So much for onwards, upwards evolution. It also seemed to challenge the belief that the platypus evolved in Australia. It was suggested that early platypuses could have migrated from South America to Australia via Antarctica, using a presumed land bridge present 'millions of years ago'.

But then came the 1999 *Teinolophos* discovery which, because of its 'age', was claimed as an even earlier predecessor. So, scientific opinion now holds the platypus's migration across Antarctica to have started in Australia, not South America. This supposed 'ancestor' is so tiny, the modern platypus would no longer be described as "small and degenerate' by comparison. It would have weighed only about 40 grams (1½ oz.) as an adult.

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