非洲肺鱼

现生肺鱼中的耐旱代表

现生肺鱼共有三属六种。其中非洲肺鱼属现存4个物种，广泛分布于热带非洲的淡水生境，包括沼泽、湿地、水流缓慢的河流以及季节性泛滥平原。它们身形细长如鳗鱼，体表具有圆鳞，眼睛较小，长有可以碾碎硬质食物的坚硬齿板。其胸鳍和腹鳍呈细长的鞭状或丝状结构，具有发达肌肉，可以在水底支撑身体，表现出类似“行走”的运动方式。非洲肺鱼拥有高度发达的肺部，是主要依靠空气呼吸的肉食性鱼类。旱季时，它们可钻入泥中分泌黏液形成“硬茧”，通过降低代谢进入休眠状态，在长期缺水环境中存活。

African lungfish

A Group of Drought-Adapted Living Lungfish

There are six extant species of lungfish belonging to three genera. The genus *Protopterus* (African lungfishes) includes four living species, widely distributed in freshwater habitats across tropical Africa, including swamps, wetlands, slow-flowing rivers, and seasonally flooded plains. With an elongated, eel-like body, African lungfishes possess small round scales and small eyes and strong tooth plates adapted for crushing hard food items. Their pectoral and pelvic fins are elongated and filamentous, supported by well-developed muscles, allowing them to prop up their bodies underwater and perform a form of “walking-like” locomotion underwater or on muddy surfaces. African lungfishes possess highly developed lungs and are carnivorous fishes that rely primarily on air breathing. During the dry season, they can burrow into mud and secrete mucus to form a protective “cocoon,” entering a state of dormancy with reduced metabolism and surviving prolonged periods of drought.

南美肺鱼

现生肺鱼中的呼吸特化代表

南美肺鱼是南美洲唯一一种现生肺鱼，主要栖息在亚马孙河、巴拉圭河及巴拉那河流域的沼泽和静水中。外形酷似大型鳗鱼或蝾螈，最大体长可达1.25米。成体的腮呼吸功能明显退化，具有发达的成对肺，必须定期到水面呼吸空气。与非洲肺鱼结茧夏眠的策略不同，当旱季来临时，南美肺鱼会钻入30至50的厘米深泥层，用泥土封堵泥洞顶部，仅保留若干呼吸孔，在洞穴内依靠低代谢和肺呼吸度过旱季。

Lepidosiren paradoxa

A Respiratory Specialist Among Living Lungfishes

The South American lungfish is the only extant lungfish species in South America. It mainly inhabits swamps and still waters in the Amazon, Paraguay, and Paraná river basins. Its body resembles a large eel or salamander, reaching up to about 1.25 m in length. Its gills are highly reduced, and respiration depends largely on a pair of lungs that take oxygen directly from the air. Thus it must regularly surface to breath air. Unlike African lungfishes, which form a mucus cocoon during aestivation, the South American lungfish burrows 30–50 cm into the mud when the dry season arrives, seals the top of the burrow with mud while retaining a few breathing openings, and survives by lowering its metabolism and breathing with its lungs.

澳洲肺鱼

现生肺鱼中的古老代表

澳洲肺鱼是现存六种肺鱼中最古老、最原始的一种。其自然分布范围极窄，仅见于澳大利亚昆士兰州的少数河流。与非洲、南美肺鱼相比，澳洲肺鱼身形粗壮，体表覆盖较大鳞片，保留了大型桨状肉质偶鳍，其内部骨骼结构更接近陆生脊椎动物祖先。澳洲肺鱼仅具有一个功能性肺，平时主要依靠发达的鳃在水下呼吸，只有水体严重缺氧时才浮出水面吞咽空气。澳洲肺鱼没有演化出钻泥夏眠的能力，依赖稳定水域生存，水体彻底干涸便无法存活。该物种寿命可达百年，受栖息地萎缩影响，被 IUCN 列为濒危（EN）物种，受到澳大利亚严格法律保护。

Neoceratodus forsteri

An Ancient Representative Among Living Lungfishes

The Australian lungfish is often regarded as the most conservative of the six living lungfish species. Its natural distribution is extremely restricted, occurring only in a few rivers in Queensland, Australia. Compared with African and South American lungfishes, it has a more robust body covered by large scales and retains broad, paddle-shaped fleshy paired fins whose internal skeletal organization resembles that of early sarcopterygians. It has a single functional lung and normally relies on well-developed gills for aquatic respiration, surfacing to gulp air only when dissolved oxygen becomes very low. Unlike the other living lungfish lineages, it cannot survive complete desiccation by burrowing and aestivating. Individuals may live for many decades, and the species is listed as Endangered (EN) by the IUCN and is legally protected in Australia.

张氏翼鳕

罗平生物群中体型最大的基干辐鳍鱼类捕食者之一

张氏翼鳕体长约30厘米，体型呈流线型，具有较大的口裂和锋利的牙齿，显示其具备较强的捕食能力，可能捕食小型无脊椎动物及其他水生动物。辐鳍鱼类起源于古生代，并在随后的地质历史过程中持续演化和分化。进入中生代后，辐鳍鱼类经历快速辐射演化，形成了丰富多样的生态类型，并逐渐成为现代硬骨鱼类中的优势类群。以张氏翼鳕为代表的罗平辐鳍鱼类，展示了三叠纪早期鱼类生态策略多样化的发展，也反映了现代鱼类身体结构演化形成过程中的重要阶段。

Pteronisculus changae

One of the Largest Basal Actinopterygian Predators in the Luoping Biota

Pteronisculus changae reached approximately 30 cm in length and possessed a streamlined body, a large gape, and sharp teeth, indicating substantial predatory capability. It likely preyed on small invertebrates and other aquatic animals. Ray-finned fishes originated in the Paleozoic and continued to diversify throughout geological history. During the Mesozoic, they underwent a major evolutionary radiation, giving rise to a wide range of ecological forms and eventually becoming the dominant group of modern bony fishes. Represented by *Pteronisculus changae*, the ray-finned fishes of the Luoping Biota reveal the early diversification of fish ecological strategies during the Triassic and provide important insights into the evolutionary development of body structures characteristic of modern fishes.

豹纹鳃棘鲈

珊瑚礁中的斑点猎手

豹纹鳃棘鲈是一种生活于西太平洋海域的石斑鱼类，主要分布于日本南部至澳大利亚附近的珊瑚礁海域。其身体修长，体色可由红色、灰色至褐色变化，头部、身体和各鳍散布许多鲜艳的蓝色斑点，形成醒目的斑纹。豹纹鳃棘鲈通常单独活动，是珊瑚礁中的捕食性鱼类。其口裂较大，颌部具有发达的犬齿，成鱼主要捕食其他鱼类，幼鱼也会摄食甲壳动物和头足类等无脊椎动物。作为珊瑚礁中的重要捕食性鱼类，它同时也具有较高的渔业和观赏价值。

Plectropomus leopardus

The Spotted Hunter of Coral Reefs

The leopard coralgrouper is a grouper found in the western Pacific, mainly inhabiting coral reefs from southern Japan to waters around Australia. It has an elongate body, with coloration ranging from red and gray to brown. Numerous bright blue spots are scattered across the head, body, and fins, forming a striking pattern. Leopard coralgroupers are generally solitary and are important predators on coral reefs. They have a large mouth and well-developed canine teeth. Adults feed mainly on other fishes, while juveniles also consume invertebrates such as crustaceans and cephalopods. As an important predatory fish in coral reef ecosystems, the leopard coralgrouper also has considerable value in fisheries and aquaculture.

家鸭（多肢畸形标本）

发育异常中的身体密码

这是一件胚胎发育异常形成的“四脚鸭”标本。鸟类起源于兽脚类恐龙，在漫长的演化历程中，前肢特化为翅膀，后肢承担主要运动功能。但脊椎动物附肢的构建，仍受一套高度保守的发育调控机制控制。当胚胎发育过程中相关信号通路发生异常时，可能导致附肢数量或形态发生改变。这只鸭子多出的后肢并非返祖现象，只是胚胎发育带来的偶然畸形。

Anas platyrhynchos var. *domestica* (Polymelia Specimen)

The Developmental Code Behind an Abnormal Body Plan

This specimen is a “four-legged duck” resulting from an abnormality during embryonic development. Birds originated from theropod dinosaurs, and throughout their evolutionary history, the forelimbs became specialized into wings while the hind limbs took on the primary role in locomotion. However, the development of vertebrate limbs is still governed by highly conserved regulatory mechanisms. When these developmental signaling pathways are disrupted during embryogenesis, variations in limb number or morphology may occur. The additional hind limbs of this duck do not represent an evolutionary reversion, but rather an accidental developmental anomaly.

少肢变异龟

肢体缺陷的个体差异

这是一件表现为单侧后肢缺失的龟标本。该标本在胚胎发育过程中，由于四肢形成的调控机制发生异常，导致一侧后肢未能正常发育，从而呈现出肢体缺失的形态。龟鳖目具有独特的龟壳和四肢结构，并在长期演化中形成了稳定的身体构型。这一标本为研究脊椎动物四肢形成、身体结构演化以及发育调控机制提供了直观的案例。

Turtle with Limb Deficiency

Individual Variation in Limb Deficiency

This specimen is a turtle exhibiting the loss of a single hind limb. During embryonic development, an abnormality in the regulatory mechanisms controlling limb formation prevented one hind limb from developing normally, resulting in the observed limb deficiency. Turtles possess a unique body plan characterized by a protective shell and specialized limbs, which has remained relatively stable throughout their evolutionary history. This specimen provides an intuitive example for understanding vertebrate limb development, the evolution of body structures, and the regulatory mechanisms underlying development.

鳄鱼（胚胎）

鳄类：现生主龙的代表

鳄类是现生动物中与鸟类亲缘关系最近的类群之一，二者共同属于主龙类演化支系。主龙类还包括已经灭绝的恐龙等类群，是理解鸟类起源和爬行动物演化的重要分支。

Crocodylia(Embryo)

Crocodilians: Living Representatives of Archosaurs

Crocodilians are among the closest living relatives of birds. Together, crocodilians and birds belong to the archosaur lineage, which also includes extinct dinosaurs and represents an important branch for understanding the evolution of modern birds and reptiles.

家鸡（胚胎）

恐龙后裔的生命起点

家鸡胚胎展示了鸟类生命早期身体结构形成的过程。随着胚胎发育，头部、脊柱和附肢等结构逐渐建立，并最终形成适应飞行生活的鸟类身体构型。现代鸟类起源于兽脚类恐龙，其胚胎发育过程体现了脊椎动物共同的发育基础，也为理解鸟类身体结构的形成和演化历史提供了直观证据。

Gallus gallus domesticus(Embryo)

The Beginning of Life for Dinosaur Descendants

A chicken embryo reveals the early formation of body structures during avian development. As embryonic development proceeds, structures such as the head, vertebral column, and limbs are gradually established, eventually forming the body plan characteristic of birds. Modern birds originated from theropod dinosaurs, and their embryonic development reflects the conserved developmental foundations shared among vertebrates. This specimen provides a direct view into the formation of avian body structures and offers insights into the evolutionary history of birds.

鲨鱼

软骨鱼类的早期成长

鲨鱼胚胎展示了软骨鱼类生命早期的发育过程。部分鲨类通过卵鞘保护胚胎，使其在相对安全的环境中完成发育。胚胎时期，鲨鱼逐渐形成流线型身体、鳍和尾部等适应游泳生活的结构。作为古老的有颌脊椎动物类群，鲨类的胚胎发育为研究鱼类身体结构形成和软骨鱼类演化提供了重要窗口。

Selachimorpha

Early Development in Cartilaginous Fishes

A shark embryo reveals the early developmental processes of cartilaginous fishes. Some shark species protect their embryos within egg cases, allowing development to occur in a relatively safe environment. During embryonic development, sharks gradually form a streamlined body, fins, and a tail adapted for efficient swimming. As an ancient lineage of jawed vertebrates, sharks provide important insights into the formation of fish body structures and the evolutionary history of cartilaginous fishes.

蝾螈（胚胎）

从水中孕育出的四肢蓝图

蝾螈胚胎展示了两栖动物生命早期的发育过程。蝾螈通常在水中产卵，胚胎经过细胞分裂、组织分化和器官形成，逐渐建立头部、躯干、尾部以及四肢等身体结构。与鱼类相比，蝾螈幼体和成体均具有成对附肢，是研究四足动物身体构型形成的重要材料。蝾螈属于两栖动物，其发育过程体现了脊椎动物从水生祖先向陆地生活适应过程中形成的关键结构。

Salamandridae(Embryo)

A Tetrapod Blueprint Emerging from Water

Salamander embryos reveal the early developmental processes of amphibian life. Salamanders typically lay eggs in water, where embryos undergo cell division, tissue differentiation, and organ formation, gradually developing structures such as the head, trunk, tail, and limbs. Unlike fishes, salamander larvae and adults possess paired appendages, making them important models for understanding the formation of the tetrapod body plan. As amphibians, salamanders provide insights into the key structural innovations that emerged during the evolutionary transition from aquatic ancestors to life on land.