Hidden Family Clues

Compare embryos to look beyond adult body shape

7.16 "Obtain, evaluate, and communicate evidence comparing patterns in the embryological development of multiple species to identify relationships not evident in the fully formed adult anatomy."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Circle the adult traits that make the dolphin and tuna look alike. Underline two patterns in the passage that the dolphin and dog embryos share.

What Embryos Reveal

1. At the surface, a dolphin looks more like a tuna than a dog. Both swimmers have smooth bodies and fins, while a dog runs on legs. But a similar body shape can help animals move through water even if they are not close relatives. To investigate relationships, scientists also compare embryos, animals during their early development. They look at the same body parts at similar stages, before those parts take their adult forms. A feature shared during development may reveal a connection that the outside of an adult body hides.

2. Early dolphin and dog embryos each grow a front limb bud on each side. Inside each bud, cartilage begins to form an upper arm, a forearm, and five digits. In a dolphin, these parts become hidden within a flipper; in a dog, they become part of a front leg and paw. Both embryos also start hindlimb buds. A dog's hindlimb buds develop into legs, but a dolphin's shrink and do not become external legs. Their early patterns match in ways their adult outlines do not.

3. A tuna embryo also grows side buds, but its front buds develop into fins supported by fin rays, not limbs with five digits. A tuna's rear buds form pelvic fins rather than disappearing like a dolphin's hindlimb buds. This contrast helps explain why a dolphin's adult shape is a poor guide to its closest relatives in this group. The shared pattern of limb bones and buds supports a closer relationship between dolphins and dogs than between dolphins and tuna. Embryo evidence is useful, but scientists check it against other evidence, such as DNA.

2 ANSWER WITH EVIDENCE

Use the passage

1. How do the front limb buds of dolphin and dog embryos develop alike, and how do tuna front buds develop differently?

2. Compare what happens to the hindlimb buds of dolphin and dog embryos. What does their shared starting pattern show?

3. A student says dolphins must be more closely related to tuna than to dogs because dolphins and tuna look alike. What embryo evidence challenges this claim?

4. Why should scientists check embryo patterns against DNA before deciding how closely species are related?

3 YOUR TURN

Your own words

Imagine an unknown sea animal with a smooth, fishlike adult body. Its embryo forms five digits in each front limb, and its hindlimb buds later shrink. In three sentences, compare its development with two species in the passage and explain why adult shape alone could mislead you.

Hidden Family Clues

PART 1 · READ AND MARK

Circle the adult traits that make the dolphin and tuna look alike. Underline two patterns in the passage that the dolphin and dog embryos share. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How do the front limb buds of dolphin and dog embryos develop alike, and how do tuna front buds develop differently?	**Dolphin and dog front limb buds form an upper arm, a forearm, and five digits. Tuna front buds form fins supported by fin rays, not limbs with five digits.**
2	Compare what happens to the hindlimb buds of dolphin and dog embryos. What does their shared starting pattern show?	**Both start hindlimb buds. Dog buds develop into legs, while dolphin buds shrink. Their shared early pattern shows a connection that is not clear from their adult outlines.**
3	A student says dolphins must be more closely related to tuna than to dogs because dolphins and tuna look alike. What embryo evidence challenges this claim?	**Dolphin and dog embryos form similar front limb bones and five digits, while tuna embryos form fins with fin rays. Dolphins and dogs also both start hindlimb buds.**
4	Why should scientists check embryo patterns against DNA before deciding how closely species are related?	**Embryo patterns provide evidence of a relationship, but scientists use DNA as another source of evidence to check that conclusion.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Like a dolphin embryo, the unknown animal's embryo forms five digits in each front limb and has hindlimb buds that shrink. Unlike a tuna embryo, its front limbs develop digits rather than fins supported by fin rays. Its fishlike adult shape could make it look closely related to tuna, but its development supports a closer relationship with dolphins.

Accept answers that use the passage's developmental comparisons to support a relationship, even if students use different wording. Do not accept adult body shape alone as evidence of a close relationship.