

How Cells Choose What to Become

Essential question: How can nearby neural crest cells make different fates from the same DNA?

TODAY'S TAKE-HOME A cell's fate reflects both its internal state and the cues around it. Signals can instruct, permit, or block a path.

Bring yesterday forward

Yesterday: traveling cells must arrive in the right place before they can build.

Quick reading

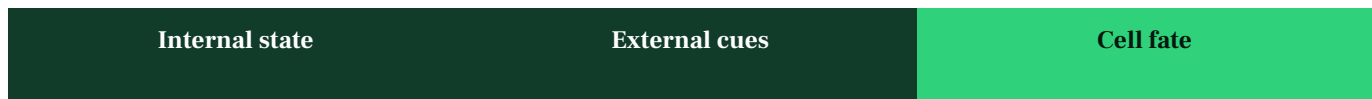
Cells with the same DNA can use different genes. Their internal state and outside cues work together to bias a cell fate.

Optional reading: <https://pmc.ncbi.nlm.nih.gov/articles/PMC11072871/>

Deck map

Slides 5-6: study and question the picture | Slide 7: name the rule | Slide 8: read the biology evidence | Slides 9-11: transfer and decide | Slides 12-13: exit and bridge.

The visual in words



Build the idea

Model start: Two cells can have the same DNA but use different genes because they receive different cues and have different internal states.

- Define cell fate in your own words.

- Sort one example into internal state and one into external cue.

- Contrast an instructive cue with a permissive condition.

- Tier 2: Apply the decision logic to Wnt, beta-catenin, bone, and cartilage.

Use the analogy, then return to the science

ANALOGY

GPS plus driver

BIOLOGY

The map inside the car and the road signs outside both shape the route.

Apply the model to Mateo

Tier 1 is the decision logic. Advanced molecular details are evidence-rich extensions, not the entry point.

What can this lesson explain? What cannot it prove?

Exit ticket and next unlock

EXIT

Contrast instructive and permissive in your own words.

NEXT

A chosen cell fate does not yet make one continuous tissue. How does a seam disappear?

Four truths check

Truth 1: Same DNA can produce different cell types because different genes are active. Circle the part of today's notes that supports this truth.