

The Gene at 1q32 Has a Name: IRF6, From DNA to Protein

What is the gene at 1q32, and what does it make?

CARRY FORWARD

Linkage follows inherited chromosome markers to narrow a gene's address before sequencing names the gene.

10-YEAR TAKEAWAY

IRF6 encodes a transcription factor that changes cell behavior by controlling other genes.

Cells differentiate	Development sculpts	Cells move	Development can go wrong
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1. Observe the analogy before naming the biology



Illustration: A recipe card becomes a kitchen supervisor

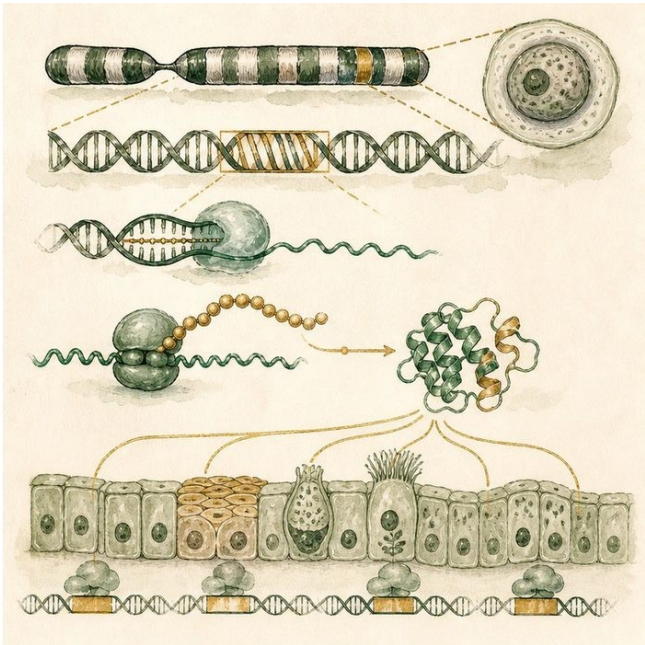
- 1. Which object stores the lasting instructions?
- 2. What copy leaves the archive?
- 3. How can one supervisor change many stations?

2. Turn observations into rules

- 1. Rule 1: DNA is transcribed into an RNA copy. Explain it in your own words.
- 2. Rule 2: RNA is translated into protein. Explain it in your own words.
- 3. Rule 3: A transcription factor regulates other genes rather than building tissue directly. Explain it in your own words.

Where the analogy stops: Genes do not contain recipes in words, and proteins do not make conscious decisions.

3. Map the rules onto the biomedical example



Biomedical teaching illustration: Trace IRF6 from gene to regulatory protein

Analogy step	Biology step	How the relationship stays the same
Recipe archive	IRF6 DNA	_____
Work order	IRF6 mRNA	_____
Supervisor	IRF6 transcription-factor protein	_____

GENETICS LESSON 5 | CASE FILE AND DECISION

4. Use the case evidence

ID	Finding supplied in the case	Why it matters
GEN05-E1	Sequencing the linked 1q32 interval identified damaging variants in IRF6.	IRF6 was the gene supported by molecular evidence.
GEN05-E2	IRF6 is transcribed into mRNA and translated into a 467-amino-acid protein.	The gene produces a specific protein product.
GEN05-E3	IRF6 contains a DNA-binding domain and regulates epithelial differentiation genes.	Its main job is control of gene activity.

5. Make the clinical decision

You are explaining the gene discovery to a molecular team. A new intern says IRF6 is a piece of lip tissue made directly from DNA.

- A. Correct the path to DNA, RNA, transcription factor, target genes, and cell behavior.
- B. Agree that DNA becomes lip tissue directly.
- C. Say IRF6 is only a chromosome marker.

Decision. Choose the correction and cite gene-product and protein-job evidence.

Claim ceiling: You may describe IRF6's molecular role. You may not say one IRF6 result explains Mateo without a case test.

Claim. State the choice you can defend.

Evidence. Use these labeled IDs: GEN05-E1 + GEN05-E2.

Reasoning. Explain why the evidence supports the claim and stays inside the claim ceiling.

6. Reduce the lesson to one lasting idea

Take-home. IRF6 encodes a transcription factor that changes cell behavior by controlling other genes.

1. What molecule is translated?
2. Why is transcription factor more accurate than structural lip protein?

Glossary

Term	Plain-English definition
transcription	The first step of making a protein: copying a DNA gene into messenger RNA.
mRNA (messenger RNA)	The working copy of a gene that carries its instructions out of the nucleus to the ribosome to be read into protein.
translation	The second step of making a protein: the ribosome reads the mRNA and builds a chain of amino acids.
transcription factor	A protein that binds DNA and turns specific genes on or off, controlling what a cell becomes and does.
IRF6	Interferon Regulatory Factor 6, a transcription factor needed by the skin-like cells that let the lip and palate fuse; a leading cleft gene.

Next lesson unlock

Now that we have the exemplar gene IRF6, where do we look up whether a given variant in it is already known, and whether it is harmful?

The journal links on the lesson page are optional. Everything required for this guided-notes set is already supplied here and in the case file.