

Hijacked Teams!

Copy Instructions

Make Single-sided Copies

- Cut each page in half to make two cards.
- This document includes 3 sets of cards, marked A, B & C.
- The cards are companions for the infections introduced in Hijacked Cells!

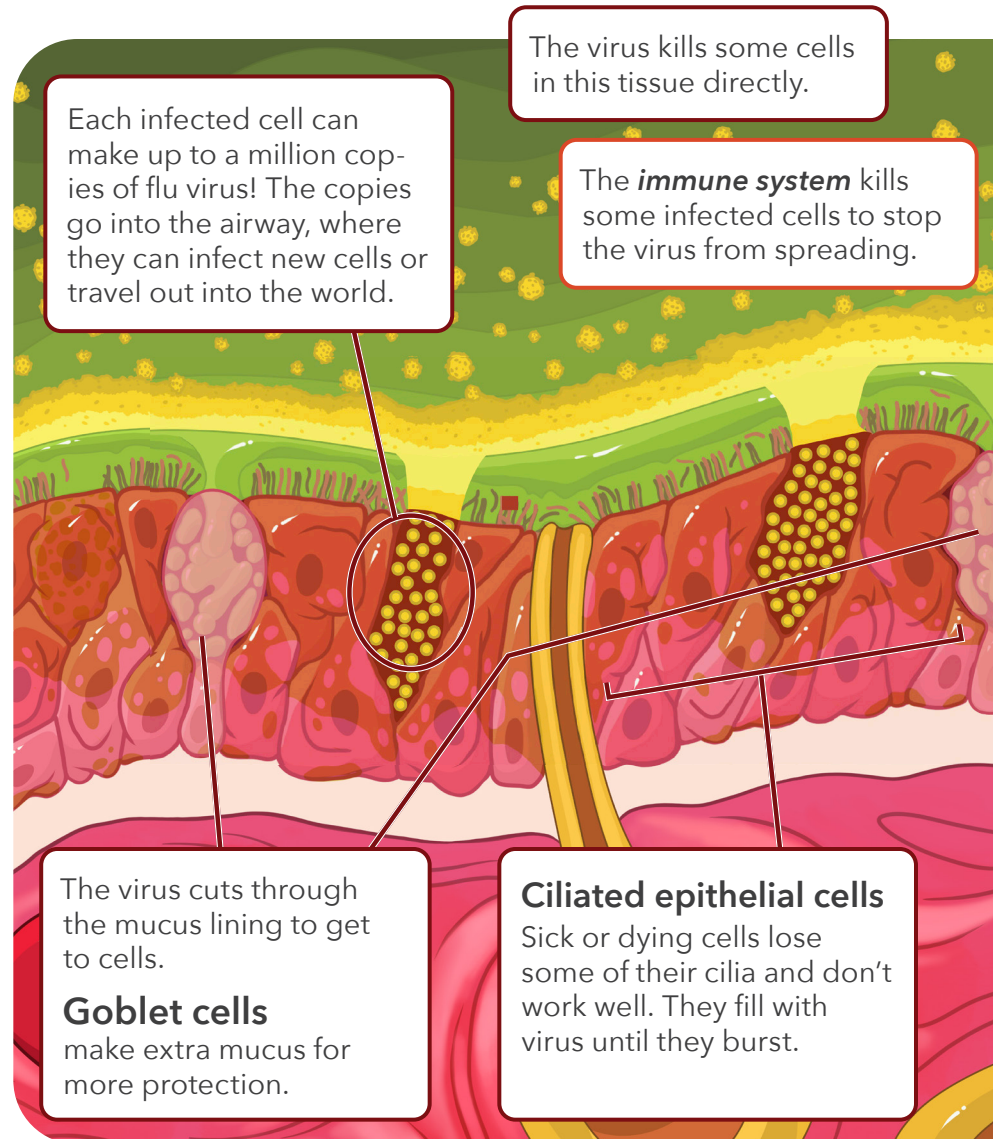
Tips

- Print in color and laminate for re-use.
- Print each set of cards on a different color of paper, to make it easier to keep track of which cards belong together.

Influenza vs. Ciliated Epithelial Cell

A

The flu can infect any cell in the airway epithelium. But it usually can't infect other types of cells. They lack the molecule the virus uses to get in. A few very nasty strains, like H1N1 "swine" flu, don't need the molecule to get in, so they can infect more cell types



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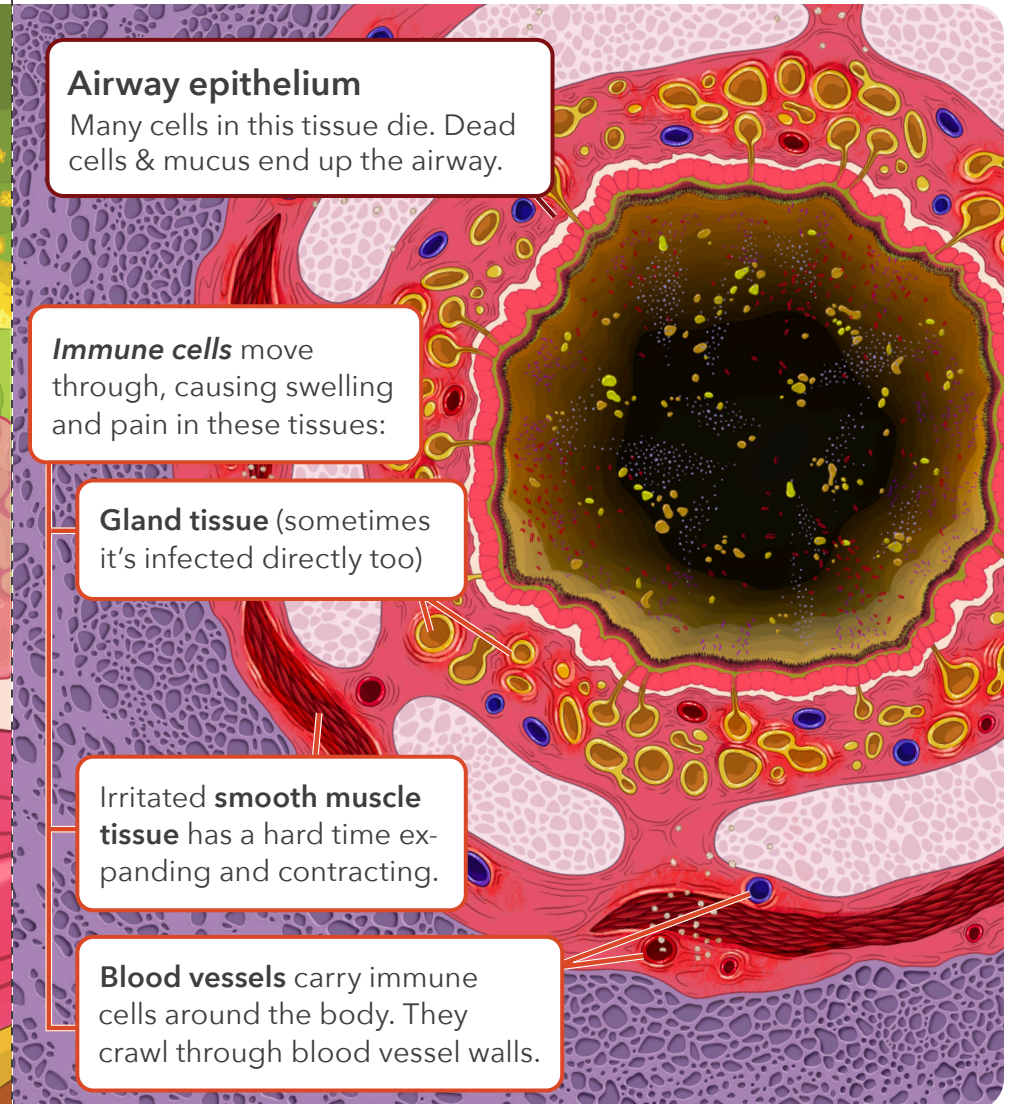
Influenza vs. Ciliated Epithelial Cell

A

Affected tissues

Some effects of the flu come directly from the virus. Others come from the immune system. You need the immune system to fight the flu, but the cells and molecules it releases have other effects.

The bronchus is shown here, but all the organs that form the airway of the respiratory system have these tissue types.



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Influenza vs. Ciliated Epithelial Cell

A

Affected respiratory organs

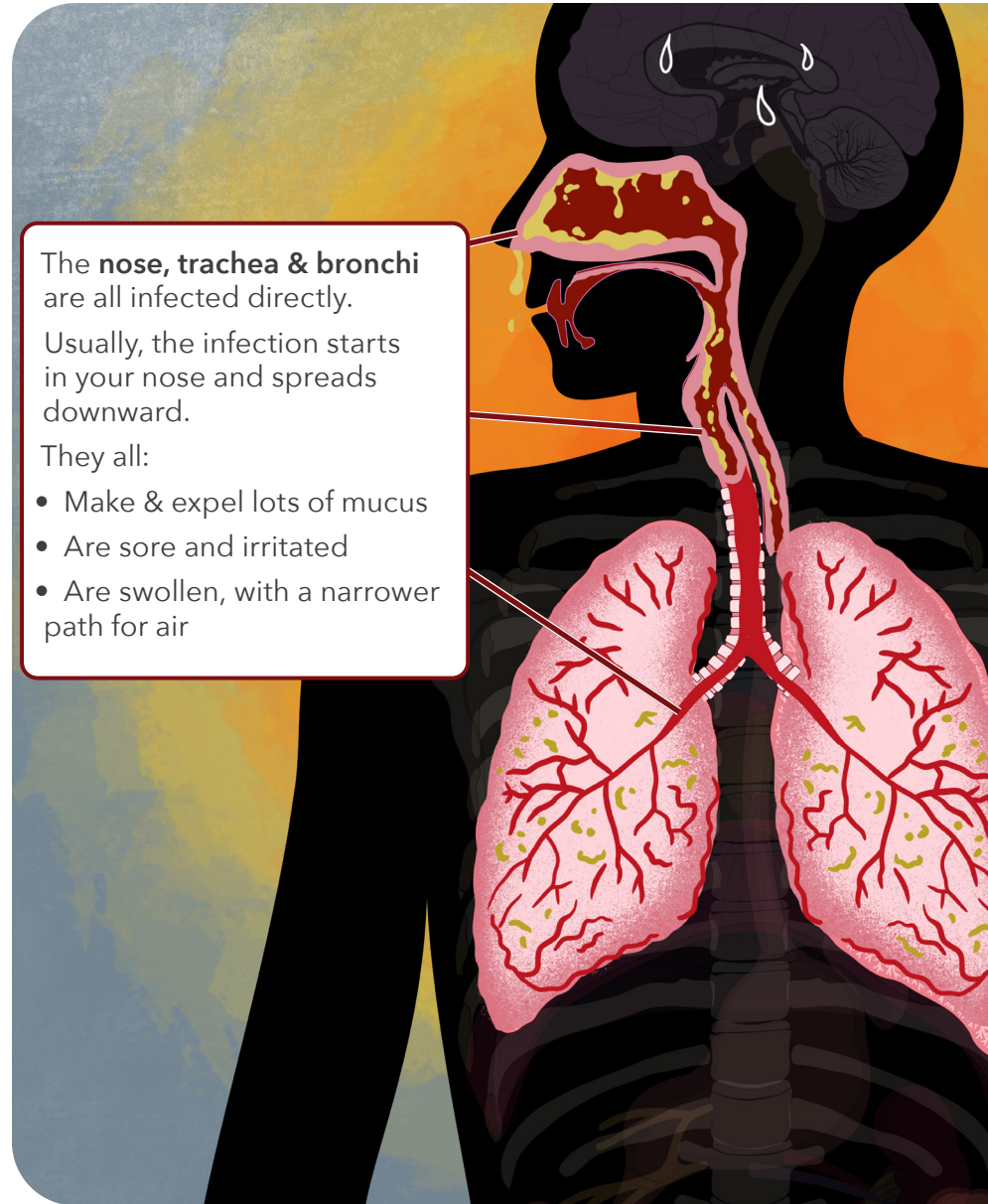
Many of the effects you feel from the flu—mostly in **respiratory organs**—are a direct result of the infection.

The **nose, trachea & bronchi** are all infected directly.

Usually, the infection starts in your nose and spreads downward.

They all:

- Make & expel lots of mucus
- Are sore and irritated
- Are swollen, with a narrower path for air



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Influenza vs. Ciliated Epithelial Cell

A

Other affected organs

The flu makes you feel bad all over. Much of what you feel is from your immune system. Parts of your immune system move through the bloodstream around your whole body as they work to kill the virus.

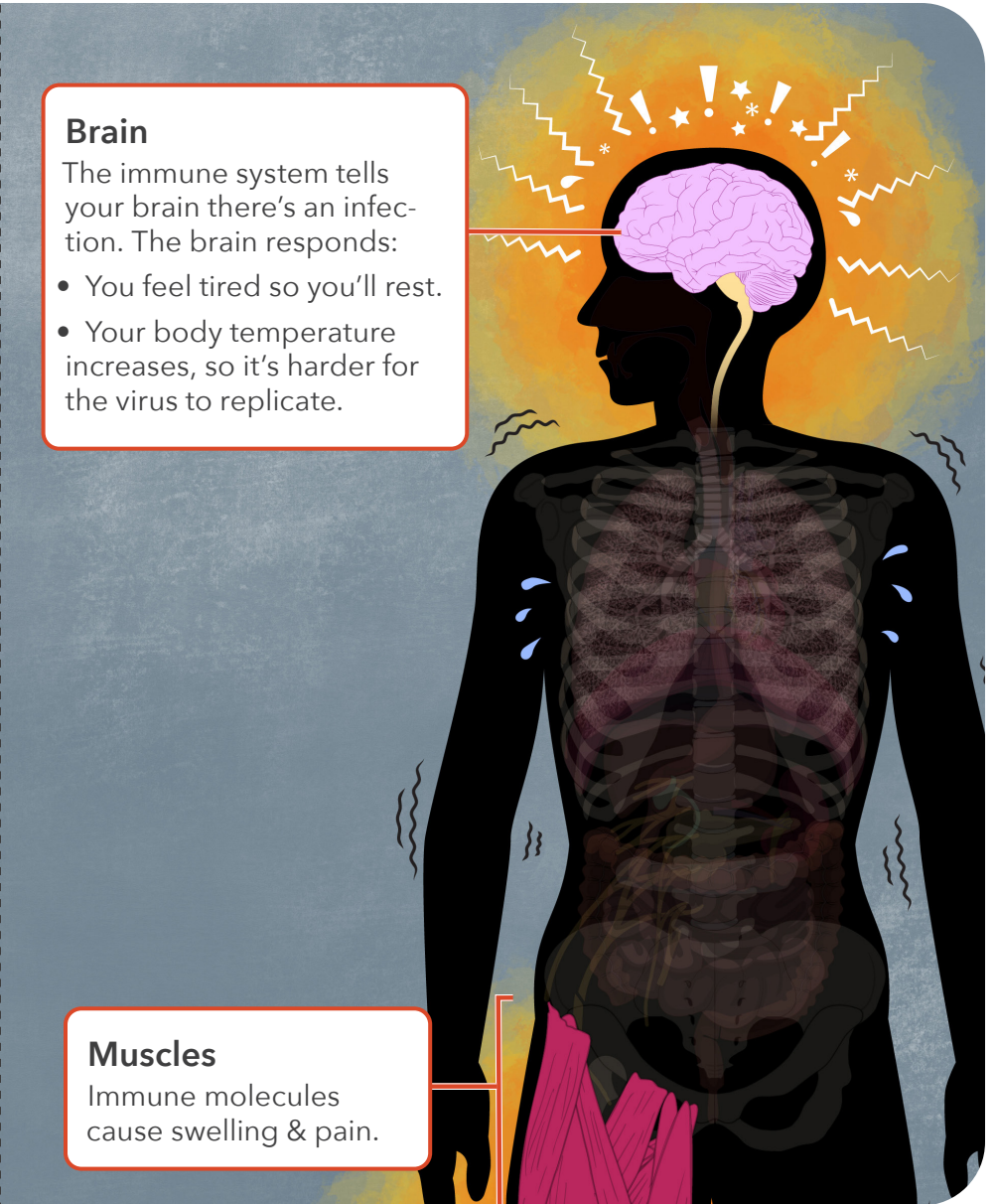
Brain

The immune system tells your brain there's an infection. The brain responds:

- You feel tired so you'll rest.
- Your body temperature increases, so it's harder for the virus to replicate.

Muscles

Immune molecules cause swelling & pain.

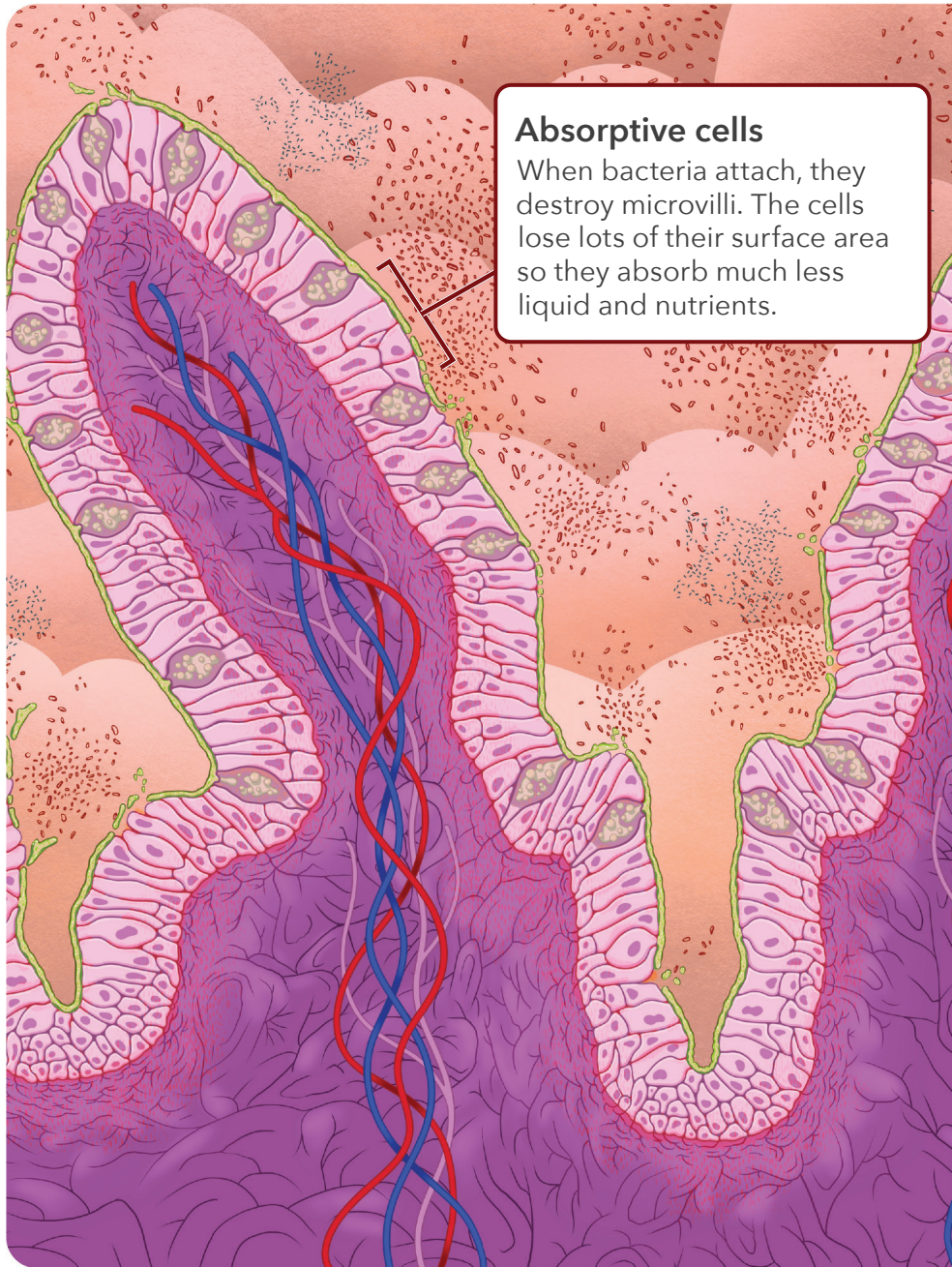


Hijacked Teams!

E. coli vs. Intestinal Absorptive Cell

B

Affected cell types



Absorptive cells

When bacteria attach, they destroy microvilli. The cells lose lots of their surface area so they absorb much less liquid and nutrients.

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E. coli vs. Intestinal Absorptive Cell

B

Affected tissues

Some effects of food poisoning come directly from the E. coli. Others come from the immune system. You need the immune system to fight the bacteria, but the cells and molecules it releases have other effects.

Intestinal epithelium

can't do its job as well, so nutrients & liquid stay inside the intestine.

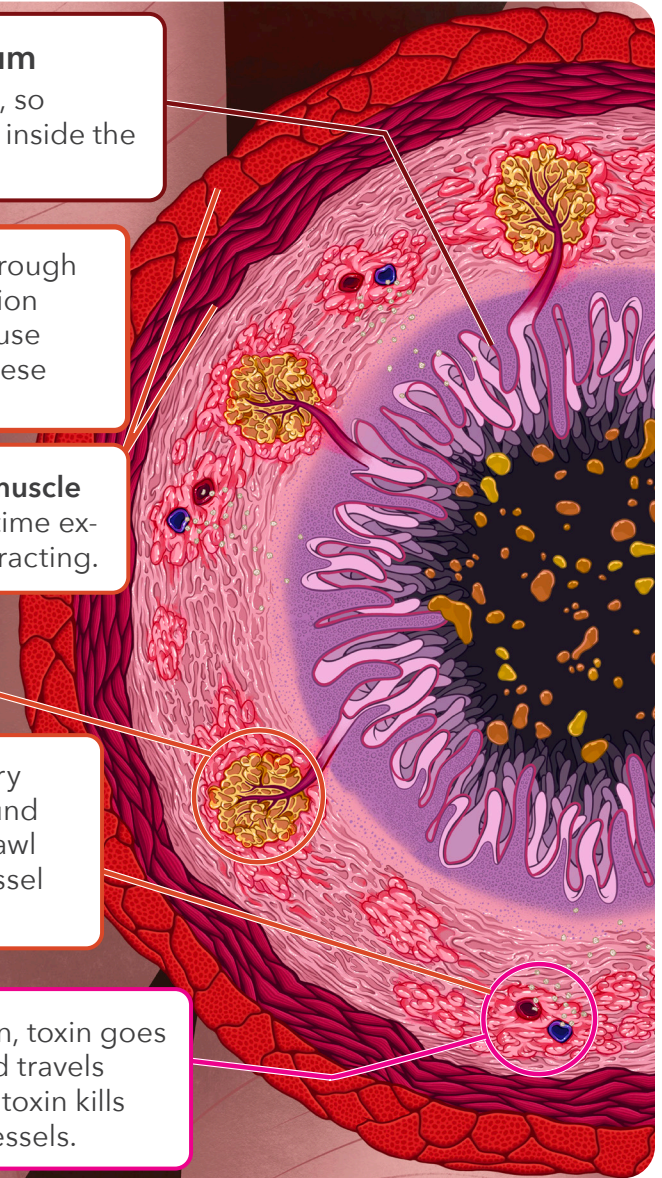
Immune cells move through as they fight the infection and the toxin. They cause swelling and pain in these tissues:

Irritated **smooth muscle tissue** has a hard time expanding and contracting.

Gland tissue

Blood vessels carry immune cells around the body. They crawl through blood vessel walls.

With a severe infection, toxin goes into **blood vessels** and travels around the body. The toxin kills cells that line blood vessels.

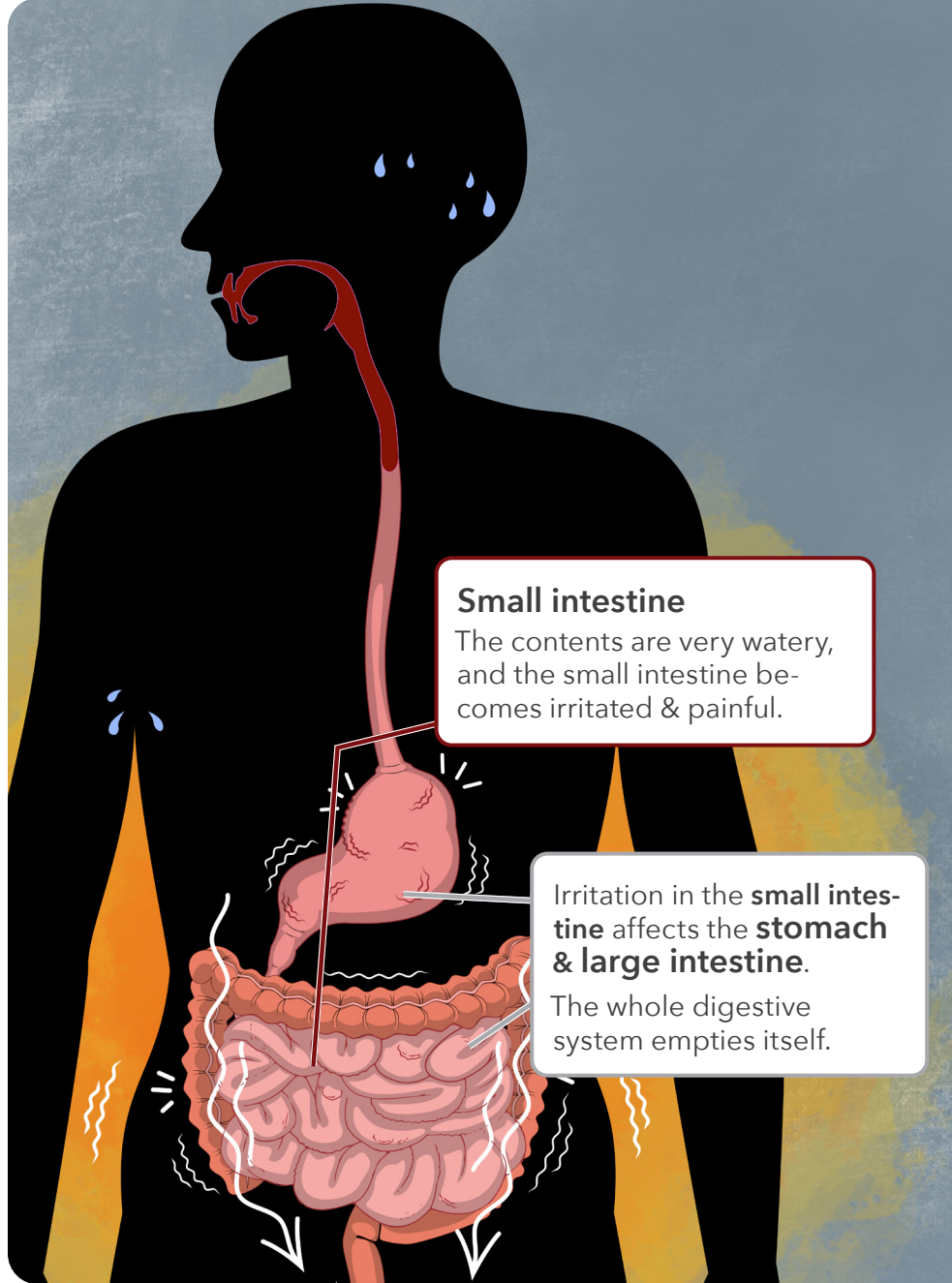


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E. coli vs. Intestinal Absorptive Cell

B

Affected digestive organs



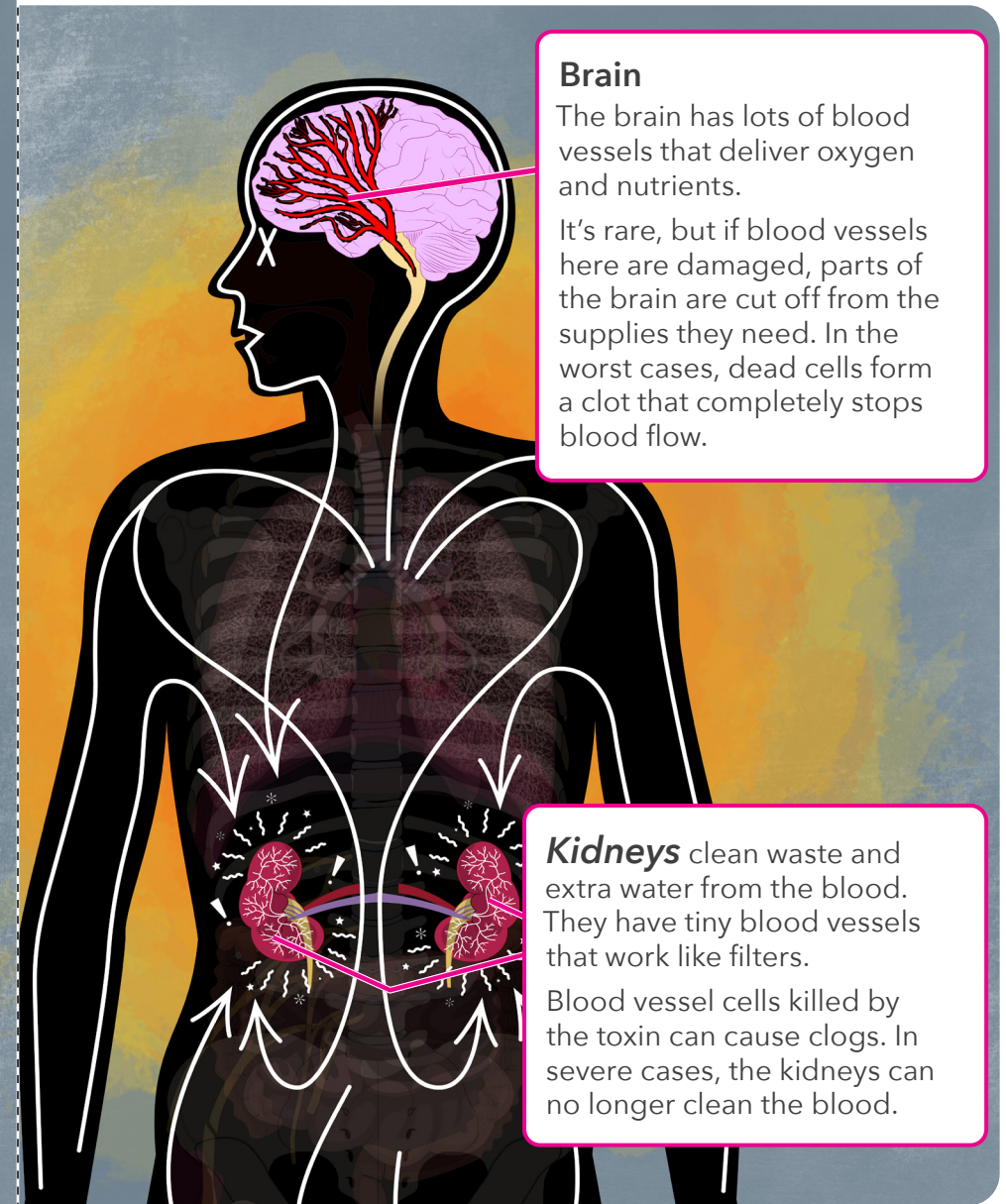
Hijacked Teams!

E. coli vs. Intestinal Absorptive Cell

B

Other affected organs

E. Coli stay in the digestive system. But in severe cases, the toxin it makes enters the blood stream and travel to organs throughout the body.



Hijacked Teams!

TSWV vs. Spongy Parenchyma Cell

Tomato spotted wilt virus also infects tiny flying insects called thrips. They carry the virus from plant to plant. They puncture leaves with their needle-like mouth parts and deliver the virus as they feed.

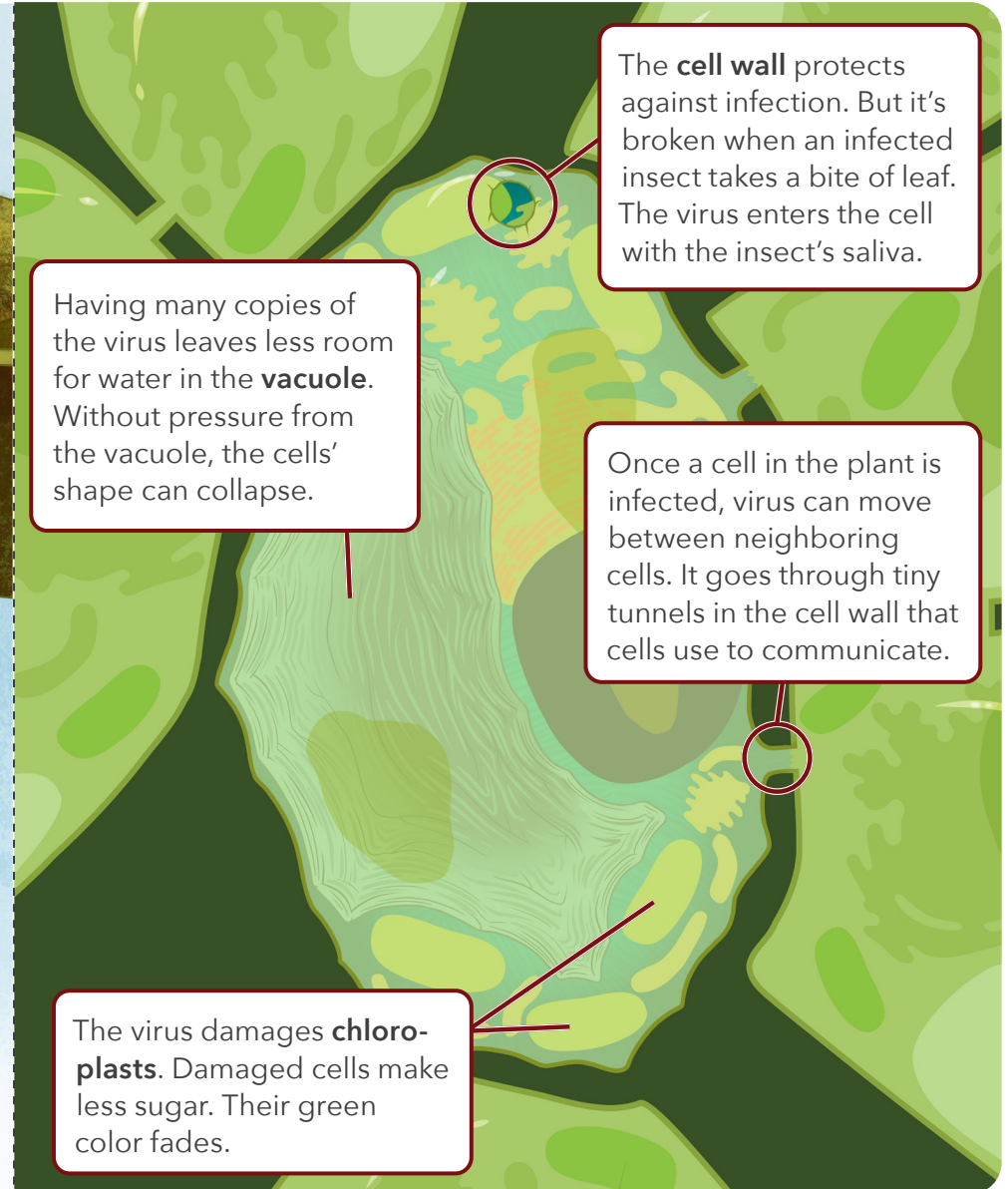


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TSWV vs. Spongy Parenchyma Cell

Tomato spotted wilt virus can infect **any cell type in the plant shoot system**.

A spongy parenchyma cell is shown here, but they're all affected the same way.



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TSWV vs. Spongy Parenchyma Cell



Affected tissues

Infected cells get soft and they can't do their jobs as well. They eventually die, leaving spots of dead tissue. Some cells are killed by the virus. Others are killed by the plant's immune system to stop the virus from spreading.

Epidermal tissue

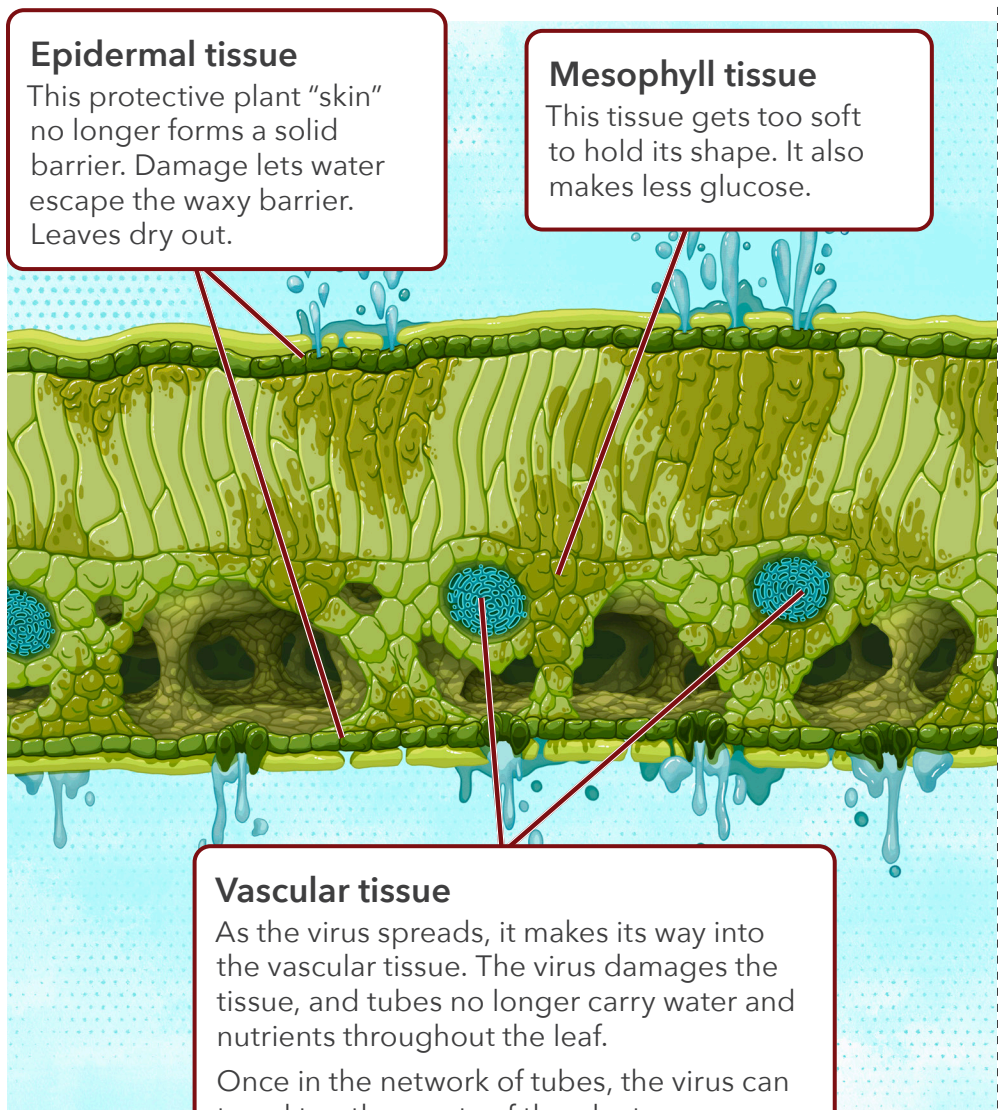
This protective plant "skin" no longer forms a solid barrier. Damage lets water escape the waxy barrier. Leaves dry out.

Mesophyll tissue

This tissue gets too soft to hold its shape. It also makes less glucose.

Vascular tissue

As the virus spreads, it makes its way into the vascular tissue. The virus damages the tissue, and tubes no longer carry water and nutrients throughout the leaf. Once in the network of tubes, the virus can travel to other parts of the plant.



Hijacked Teams!

TSWV vs. Spongy Parenchyma Cell



All organs of the plant shoot system can be infected. Spots of dead spread around the plant. If the virus spreads too far, the plant dies. Young plants are most likely to die, since they're small and the virus can take over quickly.

Buds

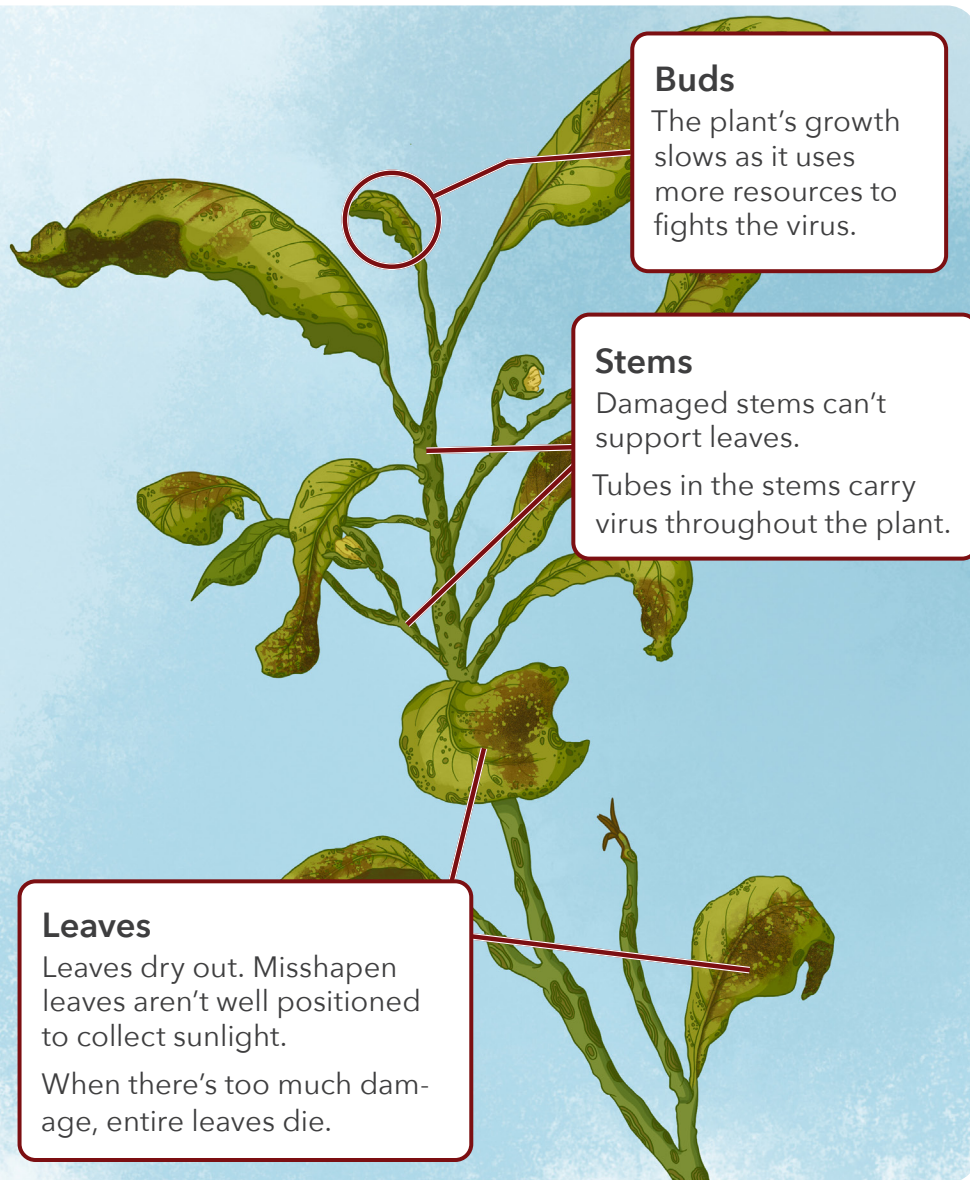
The plant's growth slows as it uses more resources to fight the virus.

Stems

Damaged stems can't support leaves. Tubes in the stems carry virus throughout the plant.

Leaves

Leaves dry out. Misshapen leaves aren't well positioned to collect sunlight. When there's too much damage, entire leaves die.



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