

How did organoids help scientists understand COVID-19?

**TEACHER'S KEY
UPPER READING LEVEL**

Check your understanding

1 Why were so many different types of organoids used in COVID-19 research?

Answer [The SARS-CoV-2 virus infects cells in many different parts of the body. Scientists used organoids to investigate how the virus affects each part of the body.]

2 What characteristic of SARS-CoV-2 helps it get through the defensive wall of the cell membrane and infect the cell?

Answer [The SARS-CoV-2 virus has spike proteins it uses to attach itself to a special receptor called ACE2. This attachment causes the cell to take in the virus.]

3 Why did some scientists use stem cells to produce the organoids rather than using adult tissue?

Answer [Certain organoids, such as the brain and kidney, could only be made using stem cells.]

4 We believe that future organoids should be connected since organ systems in the body are connected. Give an example of two organ systems that work together in the body.

Answers will vary. Some examples include:

- the respiratory system and the circulatory system
- the digestive system and the excretory system
- the skeletal system and the muscular system
- the nervous system and the endocrine system

5 Before organoids, a lot of disease research used mice in their studies. That's because mice are biologically similar to humans and get many of the same diseases. They also live short lives, so scientists can observe how a disease changes over the lifespan of the animal. Some scientists predict that organoids will replace animal studies in the future once the technology improves. Do you think that organoids will become more common than using mice for disease research in the future? Explain your answer.

Answer [Answers may vary. Students should state a claim about whether or not they think organoids will become more common in disease research. They should support their claim with reasoning. Sample reasoning includes:
 • Organoids will become more common because they come from human tissue. That means their response to disease and medication will better match what will happen to humans even better than mice.
 • Organoids will become more common for certain types of research. Animals are still better for observing diseases over a lifespan.]

Circle the organoids that were used in COVID-19 disease research.

Answer [Students should circle the eye, brain, kidney, heart, liver, lung, and intestinal organoids on the diagram.]