

## Scientists make biocomputer with brain tissue

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The merging of human and machine has taken another step forward as researchers have built a "biocomputer". Bioengineers at the University of Indiana in the USA have combined laboratory-grown human brain tissue with

microelectrodes. The scientists have dubbed their creation Brainoware. It is in its embryonic stage of development, but it can already perform complex tasks such as voice recognition. Lead researcher Dr Feng Guo hopes his softer-than-usual software will help to advance AI technologies. It could also mean AI hardware uses far less energy than solely using silicon chips. Dr Guo said: "This is just proof-of-concept to show that we can do the job. We still have a long way to go."

The researchers said their Brainoware system utilizes "organoids". These are artificially grown bundles of tissue and stem cells that resemble an organ. Dr Guo said his team's organoids are like mini-brains. They have transformed and developed neurons, akin to those found in the human brain. The researchers say their next step is to investigate how Brainoware can be adapted to undertake more higher-level tasks. The technology could one day be used to create improved models of the brain, and move neuroscience research forward. It could also lead to cures for neurological diseases. One major challenge for the researchers is to find solutions for how to keep the living tissue alive.

Sources: [nature.com](https://www.nature.com) / [newscientist.com](https://www.newscientist.com) / [sciencealert.com](https://www.sciencealert.com)

### Writing

Merging brain tissue with electrodes is dangerous. Discuss.

### Chat

Talk about these words from the article.

human / machine / biocomputers / brain tissue / creation / voice recognition / silicon / organoids / stem cells / neurons / investigate / technology / neuroscience / solutions

### True / False

- 1) A machine has taken a step towards a biocomputer. T / F
- 2) Researchers mixes lab-grown brain cells with microelectrodes. T / F
- 3) The new biocomputer is called Brainyware. T / F
- 4) New biocomputers could require less energy than traditional computers. T / F
- 5) Organoids are artificial tissue and stem cells that are grouped together. T / F
- 6) The organoids in the research have neurons similar to those in our brain. T / F
- 7) The biocomputer can already perform higher-level tasks. T / F
- 8) Researchers are pondering how to keep the tissue alive. T / F

### Synonym Match

(The words in **bold** are from the news article.)

- |                     |                |
|---------------------|----------------|
| 1. <b>merging</b>   | a. look like   |
| 2. <b>embryonic</b> | b. therapies   |
| 3. <b>complex</b>   | c. only        |
| 4. <b>solely</b>    | d. intricate   |
| 5. <b>proof</b>     | e. similar     |
| 6. <b>bundles</b>   | f. combining   |
| 7. <b>resemble</b>  | g. yackle      |
| 8. <b>akin</b>      | h. clumps      |
| 9. <b>undertake</b> | i. evidence    |
| 10. <b>cures</b>    | j. rudimentary |

### Discussion – Student A

- a) What do you think of the merging of humans and machines?
- b) What do you think of growing human brain tissue?
- c) What do you think of the idea of humans with AI brain implants?
- d) Would you have silicon chips put inside your body?
- e) What do you think of AI?
- f) How could humanlike AI robots help us in our daily lives?
- g) What is 'softer-than-usual software'?
- h) What might Brainoware might do for us?

## Phrase Match

- |   |                             |
|---|-----------------------------|
| 1. The merging                          | a. found in the human brain |
| 2. laboratory-grown                     | b. diseases                 |
| 3. It is in its embryonic stage         | c. to show that we can      |
| 4. voice                                | d. of tissue                |
| 5. This is just proof-of-concept        | e. research forward         |
| 6. These are artificially grown bundles | f. of human and machine     |
| 7. developed neurons, akin to those     | g. of development           |
| 8. move neuroscience                    | h. challenge                |
| 9. cures for neurological               | i. human brain tissue       |
| 10. One major                           | j. recognition              |

## Discussion – Student B

- What do you think about what you read?
- What do you think of the name 'Brainware'?
- What are the future dangers of this research?
- How might AI help us communicate in other languages?
- What do you know about the concept of singularity?
- How happy are you about artificial intelligence?
- What might biocomputers be able to do?
- What questions would you like to ask the bioengineers?

## Spelling

- The egrmnig of human and machine
- booartaylr-grown human brain tissue
- ubeddb their creation Brainware
- in its rnebimocy stage of development
- voice toeigocnrin
- oyesll using silicon chips
- tcaliiriilyf grown bundles of tissue
- stem cells that srmelbee an organ
- transformed and developed onusren
- their next step is to teentgsavii
- noenerieuccs research
- find lonutisso

### Answers – Synonym Match

1. f	2. j	3. d	4. c	5. i
6. h	7. a	8. e	9. g	10. b

## Role Play

### Role A – Education

You think A.I. is most useful for education. Tell the others three reasons why. Tell them why A.I. isn't as useful for their things. Also, tell the others which of these things is A.I. least useful for (and why): transport, health or climate change.

### Role B – Transport

You think A.I. is most useful for transport. Tell the others three reasons why. Tell them why A.I. isn't as useful for their things. Also, tell the others which of these things is A.I. least useful for (and why): education, health or climate change.

### Role C – Health

You think A.I. is most useful for health. Tell the others three reasons why. Tell them why A.I. isn't as useful for their things. Also, tell the others which of these things is A.I. least useful for (and why): transport, education or climate change.

### Role D – Climate Change

You think A.I. is most useful for climate change. Tell the others three reasons why. Tell them why A.I. isn't as useful for their things. Also, tell the others which of these things is A.I. least useful for (and why): transport, health or education.

## Speaking – A.I.

Rank these with your partner. Put the things AI are most useful for at the top. Change partners often and share your rankings.

- |             |                  |
|-------------|------------------|
| • Education | • Entertainment  |
| • Transport | • Legal affairs  |
| • Health    | • Inventions     |
| • Finances  | • Climate change |

### Answers – True False

1	F	2	T	3	F	4	T	5	T	6	T	7	F	8	T
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Answers to Phrase Match and Spelling are in the text.