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Level 6 – 18th December 2023

Scientists make biocomputer with brain tissue

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<https://breakingnewsenglish.com/2312/231218-brainware-biocomputer.html>

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Please try Levels 4 and 5 (they are easier).

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THE ARTICLE

From <https://breakingnewsenglish.com/2312/231218-brainware-biocomputer.html>

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 Brainware. 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 Brainware 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 Brainware can be adapted to undertake 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: <https://www.nature.com/articles/d41586-023-03975-7>
<https://www.newscientist.com/article/2407768-ai-made-from-living-human-brain-cells-performs-speech-recognition/>
<https://www.sciencealert.com/scientists-built-a-functional-computer-with-human-brain-tissue>

WARM-UPS

1. BIOCOMPUTERS: Students walk around the class and talk to other students about biocomputers. Change partners often and share your findings.

2. CHAT: In pairs / groups, talk about these topics or words from the article. What will the article say about them? What can you say about these words and your life?

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

Have a chat about the topics you liked. Change topics and partners frequently.

3. AI: Students A **strongly** believe AI intelligence should never be more powerful than human intelligence; Students B **strongly** believe otherwise. Change partners again and talk about your conversations.

4. PROS AND CONS: What are the pros and cons of biocomputers for these things? Complete this table with your partner(s). Change partners often and share what you wrote.

	Pros	Cons
Language learning		
Social media		
News		
School classrooms		
Finances		
Travel		

5. BRAIN: Spend one minute writing down all of the different words you associate with the word "brain". Share your words with your partner(s) and talk about them. Together, put the words into different categories.

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

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

VOCABULARY MATCHING

Paragraph 1

- | | |
|--------------|---|
| 1. merging | a. Not involving anyone or anything else; only. |
| 2. dubbed | b. An abstract idea. |
| 3. embryonic | c. Combining to form a single entity. |
| 4. complex | d. Given an unofficial name or nickname to. |
| 5. solely | e. Consisting of many different and connected parts. |
| 6. proof | f. Evidence or argument establishing a fact or the truth of a statement. |
| 7. concept | g. Of a system, idea, or organization in an early stage with potential for development. |

Paragraph 2

- | | |
|------------------|--|
| 8. utilizes | h. Carry out research or study into a subject or problem. |
| 9. bundle | i. Of similar character. |
| 10. resemble | j. Cells that transmit nerve impulses. |
| 11. neurons | k. Makes practical and effective use of. |
| 12. akin | l. The study of the brain, psychology, and the function of the nervous system. |
| 13. investigate | m. A collection of things or quantity of material tied or wrapped up together. |
| 14. neuroscience | n. Have a similar appearance to or qualities in common with (someone or something); look or seem like. |

BEFORE READING / LISTENING

From <https://breakingnewsenglish.com/2312/231218-brainaware-biocomputer.html>

1. TRUE / FALSE: Read the headline. Guess if a-h below are true (T) or false (F).

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**

2. SYNONYM MATCH: (The words in **bold** are from the news article.)

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

3. PHRASE MATCH: (Sometimes more than one choice is possible.)

- | | |
|---|-----------------------------|
| 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 |

GAP FILL

From <https://breakingnewsenglish.com/2312/231218-brainaware-biocomputer.html>

The merging of human and machine has taken another (1) _____ forward as researchers have built a "biocomputer". Bioengineers at the University of Indiana in the USA have (2) _____ laboratory-grown human brain tissue with microelectrodes. The scientists have (3) _____ their creation Brainware. It is in its embryonic (4) _____ of development, but it can already perform complex tasks such as voice (5) _____. Lead researcher Dr Feng Guo hopes his softer-than-usual software will help to (6) _____ AI technologies. It could also mean AI hardware uses far less energy than (7) _____ using silicon chips. Dr Guo said: "This is just proof-of- (8) _____ to show that we can do the job. We still have a long way to go."

dubbed
recognition
concept
step
solely
combined
stage
advance

The researchers said their Brainware system (9) _____ "organoids". These are artificially grown (10) _____ of tissue and stem cells that (11) _____ an organ. Dr Guo said his team's organoids are like mini-brains. They have transformed and developed neurons, (12) _____ to those found in the human brain. The researchers say their next step is to (13) _____ how Brainware can be adapted to undertake higher-level tasks. The technology could one day be used to create improved (14) _____ of the brain, and move neuroscience research forward. It could also lead to (15) _____ for neurological diseases. One major challenge for the researchers is to find solutions for how to keep the (16) _____ tissue alive.

models
akin
living
bundles
resemble
cures
investigate
utilizes

LISTENING – Guess the answers. Listen to check.

From <https://breakingnewsenglish.com/2312/231218-brainoware-biocomputer.html>

- 1) The merging of human and machine has taken _____
 - a. another steps forward
 - b. another step forward
 - c. another stepped forward
 - d. another strep forward
- 2) at the University of Indiana in the USA have combined laboratory-grown _____
 - a. human brain fissure
 - b. human brain atishoo
 - c. human brain tissue
 - d. human brain tissuey
- 3) scientists have dubbed their creation Brainoware. It is in _____
 - a. its embryo nick stage
 - b. its embracing stage
 - c. its embroidery stage
 - d. its embryonic stage
- 4) but it can already perform complex tasks such _____
 - a. as voice recognition
 - b. ash voice recognition
 - c. has voice recognition
 - d. as voice wreck cognition
- 5) uses far less energy than solely using silicon chips. Dr Guo said: "This is just _____"
 - a. prove-of-concept
 - b. proof-of-concept
 - c. proof-off-concept
 - d. prof-of-concept
- 6) The researchers said their Brainoware _____
 - a. system utilizes organists
 - b. system utilizes organizes
 - c. system utilizes organ ads
 - d. system utilizes organoids "
- 7) These are artificially grown bundles of tissue and stem cells that _____
 - a. ensemble an organ
 - b. assemble an organ
 - c. resemble an organ
 - d. tremble an organ
- 8) They have transformed and developed neurons, _____
 - a. skin to those
 - b. aching to those
 - c. acne to those
 - d. akin to those
- 9) The researchers say their next step is _____
 - a. to investigate how
 - b. to instigate how
 - c. to in vegetate how
 - d. to investiture how
- 10) One major challenge for the researchers is _____
 - a. to fend solutions
 - b. to fund solutions
 - c. to fond solutions
 - d. to find solutions

LISTENING – Listen and fill in the gaps

From <https://breakingnewsenglish.com/2312/231218-brainware-biocomputer.html>

The (1) _____ and machine has taken another step forward as researchers have built a "biocomputer". Bioengineers at the University of Indiana in the USA (2) _____-grown human brain tissue with microelectrodes. The scientists have (3) _____ Brainware. It is in its embryonic stage of development, but it can already perform complex tasks such (4) _____. 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 (5) _____ chips. Dr Guo said: "This is just (6) _____ to show that we can do the job. We still have a long way to go."

The researchers said their Brainware system utilizes "organoids". These are artificially (7) _____ tissue and stem cells that resemble an organ. Dr Guo said his team's organoids are (8) _____. They have transformed and developed neurons, (9) _____ found in the human brain. The researchers say their next step is to investigate how Brainware can be adapted to undertake (10) _____. The technology could one day be used to create improved models of the brain, and move neuroscience research forward. It could also (11) _____ for neurological diseases. One major challenge for the researchers is to find solutions for how to keep the (12) _____.

COMPREHENSION QUESTIONS

From <https://breakingnewsenglish.com/2312/231218-brainaware-biocomputer.html>

1. What has taken another step forward?
2. What did researchers mix with lab-grown brain tissue?
3. What can the biocomputer recognize?
4. What might the biocomputer use less of than silicon chips?
5. How far do researchers have to go?
6. What do organoids consist of?
7. What did the organoids in the biocomputer develop?
8. What tasks are the next step for the biocomputer?
9. What could the technology find cures for?
10. What do researchers want to find solutions for?

MULTIPLE CHOICE - QUIZ

From <https://breakingnewsenglish.com/2312/231218-brainaware-biocomputer.html>

- 1) What has taken another step forward?
 - a) the evolution of coding
 - b) science
 - c) the merging of human and machine
 - d) a cyborg
- 2) What did researchers mix with lab-grown brain tissue?
 - a) microelectrodes
 - b) sugar
 - c) yeast
 - d) central processing units
- 3) What can the biocomputer recognize?
 - a) its maker
 - b) light
 - c) the U.S. flag
 - d) voices
- 4) What might the biocomputer use less of?
 - a) space
 - b) energy
 - c) function keys
 - d) computer chips
- 5) How far do researchers have to go?
 - a) just down the corridor
 - b) to the Moon and back
 - c) a long way
 - d) at least 2,000 km
- 6) What do organoids consist of?
 - a) keys and pedals
 - b) tissue and stem cells
 - c) electrons and protons
 - d) hearts and lungs
- 7) What did the organoids in the biocomputer develop?
 - a) an inferiority complex
 - b) a cold
 - c) chip on their shoulders
 - d) neurons
- 8) What tasks are the next step for the biocomputer?
 - a) the shopping
 - b) higher-level tasks
 - c) binary tasks
 - d) physical and mental tasks
- 9) What could the technology find cures for?
 - a) neurological diseases
 - b) cancer
 - c) yet-to-be-discovered illnesses
 - d) ageing and baldness
- 10) What do researchers want to find solutions for?
 - a) world peace
 - b) the meaning of life
 - c) preventing singularity
 - d) keeping tissue alive

ROLE PLAY

From <https://breakingnewsenglish.com/2312/231218-brainaware-biocomputer.html>

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.

AFTER READING / LISTENING

From <https://breakingnewsenglish.com/2312/231218-brainaware-biocomputer.html>

1. WORD SEARCH: Look in your dictionary / computer to find collocates, other meanings, information, synonyms ... for the words 'brain' and 'computer'.

brain	computer
--------------	-----------------

- Share your findings with your partners.
- Make questions using the words you found.
- Ask your partner / group your questions.

2. ARTICLE QUESTIONS: Look back at the article and write down some questions you would like to ask the class about the text.

- Share your questions with other classmates / groups.
- Ask your partner / group your questions.

3. GAP FILL: In pairs / groups, compare your answers to this exercise. Check your answers. Talk about the words from the activity. Were they new, interesting, worth learning...?

4. VOCABULARY: Circle any words you do not understand. In groups, pool unknown words and use dictionaries to find their meanings.

5. TEST EACH OTHER: Look at the words below. With your partner, try to recall how they were used in the text:

<ul style="list-style-type: none">• step• combined• stage• usual• mean• proof	<ul style="list-style-type: none">• bundles• like• akin• day• lead• find
--	---

BIOCOMPUTERS SURVEY

From <https://breakingnewsenglish.com/2312/231218-brainoware-biocomputer.html>

Write five GOOD questions about biocomputers in the table. Do this in pairs. Each student must write the questions on his / her own paper. When you have finished, interview other students. Write down their answers.

	STUDENT 1 _____	STUDENT 2 _____	STUDENT 3 _____
Q.1.			
Q.2.			
Q.3.			
Q.4.			
Q.5.			

- Now return to your original partner and share and talk about what you found out. Change partners often.
- Make mini-presentations to other groups on your findings.

BIOCOMPUTERS DISCUSSION

STUDENT A's QUESTIONS (Do not show these to student B)

1. What did you think when you read the headline?
2. What images are in your mind when you hear the word 'biocomputer'?
3. What do you think of the merging of humans and machines?
4. What do you think of growing human brain tissue?
5. What do you think of the idea of humans with AI brain implants?
6. Would you have silicon chips put inside your body?
7. What do you think of AI?
8. How could humanlike AI robots help us in our daily lives?
9. What is 'softer-than-usual software'?
10. What do you hope Brainware might do for us?

Scientists make biocomputer with brain tissue – 18th December 2023
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BIOCOMPUTERS DISCUSSION

STUDENT B's QUESTIONS (Do not show these to student A)

11. Did you like reading this article? Why/not?
12. What do you think of when you hear the word 'organoid'?
13. What do you think about what you read?
14. What do you think of the name 'Brainware'?
15. What are the future dangers of this research?
16. How might AI help us communicate in other languages?
17. What do you know about the concept of singularity?
18. How happy are you about artificial intelligence?
19. What will biocomputers of the future be able to do?
20. What questions would you like to ask the bioengineers?

DISCUSSION (Write your own questions)

STUDENT A's QUESTIONS (Do not show these to student B)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

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DISCUSSION (Write your own questions)

STUDENT B's QUESTIONS (Do not show these to student A)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

LANGUAGE - CLOZE

From <https://breakingnewsenglish.com/2312/231218-brainware-biocomputer.html>

The (1) _____ 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 (2) _____ their creation Brainware. It is in its (3) _____ stage of development, but it can already perform complex tasks such as (4) _____ 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 (5) _____ energy than solely using silicon chips. Dr Guo said: "This is just (6) _____ -of-concept to show that we can do the job. We still have a long way to go."

The researchers said their Brainware system (7) _____ "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, (8) _____ to those found in the human brain. The researchers say their next step is to investigate how Brainware can be adapted (9) _____ undertake higher-level tasks. The technology could one day be used to create improved (10) _____ of the brain, and move neuroscience research forward. It could also lead to (11) _____ for neurological diseases. One major challenge for the researchers is to find solutions for how to keep the (12) _____ tissue alive.

Put the correct words from the table below in the above article.

- | | | | | |
|-----|-----------------|--------------|---------------|----------------|
| 1. | (a) merging | (b) emerging | (c) emergency | (d) emergent |
| 2. | (a) daubed | (b) dabbled | (c) dubbed | (d) dabbed |
| 3. | (a) bionic | (b) avionic | (c) embryonic | (d) histrionic |
| 4. | (a) talk | (b) aural | (c) oral | (d) voice |
| 5. | (a) less | (b) fewer | (c) total | (d) clean |
| 6. | (a) proven | (b) proof | (c) prove | (d) proved |
| 7. | (a) utilitarian | (b) utile | (c) utilities | (d) utilizes |
| 8. | (a) ajar | (b) akin | (c) skin | (d) kin |
| 9. | (a) for | (b) by | (c) to | (d) at |
| 10. | (a) nodes | (b) models | (c) plasma | (d) hippocampi |
| 11. | (a) flues | (b) clues | (c) lures | (d) cures |
| 12. | (a) lively | (b) living | (c) lifelike | (d) livelihood |

SPELLING

From <https://breakingnewsenglish.com/2312/231218-brainware-biocomputer.html>

Paragraph 1

1. The egrmnig of human and machine
2. booartaylr-grown human brain tissue
3. The scientists have ubeddb their creation Brainware
4. in its rnebimocy stage of development
5. voice toeigocnrin
6. oyesll using silicon chips

Paragraph 2

7. tcaliiralyf grown bundles of tissue
8. stem cells that srnelbee an organ
9. transformed and developed onusren
10. their next step is to teentgsavii
11. noenerieuccs research
12. find lonutisso

PUT THE TEXT BACK TOGETHER

From <https://breakingnewsenglish.com/2312/231218-brainaware-biocomputer.html>

Number these lines in the correct order.

- () researchers is to find solutions for how to keep the living tissue alive.
- () how Brainware can be adapted to undertake higher-level tasks. The technology could one day be
- () built a "biocomputer". Bioengineers at the University of Indiana in the USA have combined laboratory-grown human brain
- () stage of development, but it can already perform complex tasks such as voice
- () neurons, akin to those found in the human brain. The researchers say their next step is to investigate
- () The researchers said their Brainware system utilizes "organoids". These are artificially grown bundles of tissue and stem
- () used to create improved models of the brain, and move neuroscience research
- () 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
- () forward. It could also lead to cures for neurological diseases. One major challenge for the
- (**1**) The merging of human and machine has taken another step forward as researchers have
- () cells that resemble an organ. Dr Guo said his team's organoids are like mini-brains. They have transformed and developed
- () tissue with microelectrodes. The scientists have dubbed their creation Brainware. It is in its embryonic
- () 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."

PUT THE WORDS IN THE RIGHT ORDER

From <https://breakingnewsenglish.com/2312/231218-brainware-biocomputer.html>

1. have scientists their dubbed The creation Brainware .
2. of stage is its development . in It embryonic
3. as recognition . complex such voice performs It tasks
4. hardware uses mean could far AI It less .
5. way We a still long to have go .
6. bundles grown of are tissue . artificially These
7. brain . Akin those the to human in found
8. next is their step investigate . Researchers say to
9. lead for to It diseases . could neurological cures
10. the solutions . for One researchers to challenge find

CIRCLE THE CORRECT WORD (20 PAIRS)

From <https://breakingnewsenglish.com/2312/231218-brainaware-biocomputer.html>

The *merging / merge* 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 / combed* laboratory-grown human brain tissue with microelectrodes. The scientists have *daubed / dubbed* their creation Brainware. It is in its *embryonic / bionic* stage of development, but it can already perform complex tasks such *as / has* voice recognition. Lead researcher Dr Feng Guo hopes his softer-than-usual software will help to *advance / advancement* AI technologies. It could also mean AI hardware uses far *less / fewer* energy than *sole / solely* using silicon chips. Dr Guo said: "This is just *prove-of-concept / proof-of-concept* to show that we can *get / do* the job. We still have a long way to go."

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

Talk about the connection between each pair of words in italics, and why the correct word is correct. Look up the definition of new words.

INSERT THE VOWELS (a, e, i, o, u)

From <https://breakingnewsenglish.com/2312/231218-brainware-biocomputer.html>

Th_ m_rg_ng _f h_m_n _nd m_ch_n_ h_s t_k_n _n_th_r
st_p _f_rw_rd _s _r_s__rch_rs h_v_ b__lt _
"b__c_m_p_t_r". B__ng_n__rs _t th_ _n_v_rs_ty _f
_nd__n_ _n th_ _S_ h_v_ c_m_b_n_d l_b_r_t_ry-gr_wn
h_m_n br__n t_ss__ w_th m_cr__l_ctr_d_s. Th_
sc__nt_sts h_v_ d_bb_d th__r cr__t__n Br__n_w_r_. _t
_s _n _ts _mbry_n_c st_g_ _f d_v_l_pm_nt, b_t _t c_n
_lr__dy p_rf_rm c_mpl_x t_sks s_ch _s v__c_
r_c_gn_t__n. L__d r_s__rch_r Dr F_ng G__ h_p_s h_s
s_ft_r-th_n-s__l s_ftw_r_ w_ll h_lp t_ _dv_nc_ __
t_chn_l_g__s. _t c__ld _ls_ m__n __ h_rdw_r_ _s_s f_r
l_ss _n_rgy th_n s_l_ly _s_ng s_l_c_n ch_ps. Dr G__
s__d: "Th_s _s j_st pr__f-f-c_nc_pt t_ sh_w th_t w_
c_n d_ th_ j_b. W_ st_ll h_v_ _ l_ng w_y t_ g_."

Th_ r_s__rch_rs s__d th__r Br__n_w_r_ syst_m _t_l_z_s
"_rg_n__ds". Th_s_ _r_ _rt_f_c__lly gr_wn b_ndl_s _f
t_ss__ _nd st_m c_lls th_t r_s_mbl_ _n _rg_n. Dr G__
s__d h_s t__m's _rg_n__ds _r_ l_k_ m_n-br__ns. Th_y
h_v_ tr_nsf_rm_d _nd d_v_l_p_d n__r_ns, _k_n t_
th_s_ f__nd _n th_ h_m_n br__n. Th_ r_s__rch_rs s_y
th__r n_xt st_p _s t_ _nv_st_g_t_ h_w Br__n_w_r_ c_n
b_ _d_pt_d t_ _nd_rt_k_ h_gh_r-l_v_l t_sks. Th_
t_chn_l_gy c__ld _n_ d_y b_ _s_d t_ cr__t__mpr_v_d
m_d_ls _f th_ br__n, _nd m_v_ n__r_sc__nc_ r_s__rch
f_rw_rd. _t c__ld _ls_ l__d t_ c_r_s f_r n__r_l_g_c_l
d_s__s_s. _n_ m_j_r ch_ll_ng_ f_r th_ r_s__rch_rs _s
t_ f_nd s_l_t__ns f_r h_w t_ k__p th_ l_v_ng t_ss__
_l_v_.

PUNCTUATE THE TEXT AND ADD CAPITALS

From <https://breakingnewsenglish.com/2312/231218-brainware-biocomputer.html>

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 laboratorygrown human brain tissue with microelectrodes the scientists have dubbed their creation brainware 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 softerthanusual 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 proofofconcept to show that we can do the job we still have a long way to go

the researchers said their brainware system utilizes organoids these are artificially grown bundles of tissue and stem cells that resemble an organ dr guo said his teams organoids are like minibrains they have transformed and developed neurons akin to those found in the human brain the researchers say their next step is to investigate how brainware can be adapted to undertake higherlevel 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

PUT A SLASH (/) WHERE THE SPACES ARE

From <https://breakingnewsenglish.com/2312/231218-brainware-biocomputer.html>

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 Brainware. 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 Brainware 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 Brainware can be adapted to undertake 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.

HOMework

1. VOCABULARY EXTENSION: Choose several of the words from the text. Use a dictionary or Google's search field (or another search engine) to build up more associations / collocations of each word.

2. INTERNET: Search the Internet and find out more about this news story. Share what you discover with your partner(s) in the next lesson.

3. BIOCOMPUTERS: Make a poster about biocomputers. Show your work to your classmates in the next lesson. Did you all have similar things?

4. SINGULARITY: Write a magazine article about banning singularity (the point where AI advances beyond human control). Include imaginary interviews with people who are for and against this.

Read what you wrote to your classmates in the next lesson. Write down any new words and expressions you hear from your partner(s).

5. WHAT HAPPENED NEXT? Write a newspaper article about the next stage in this news story. Read what you wrote to your classmates in the next lesson. Give each other feedback on your articles.

6. LETTER: Write a letter to an expert on biocomputers. Ask him/her three questions about them. Give him/her three of your ideas on how best to use them. Read your letter to your partner(s) in your next lesson. Your partner(s) will answer your questions.

ANSWERS

VOCABULARY (p.4)

1. c 2. d 3. g 4. e 5. a 6. f 7. b
8. k 9. m 10. n 11. j 12. i 13. h 14. l

TRUE / FALSE (p.5)

- 1 F 2 T 3 F 4 T 5 T 6 T 7 F 8 T

SYNONYM MATCH (p.5)

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

COMPREHENSION QUESTIONS (p.9)

1. The merging of human and machine
2. Microelectrodes
3. Voices
4. Energy
5. A long way
6. Bundles of tissue and stem cells
7. Neurons
8. Higher-level tasks
9. Neurological diseases
10. Keep the living tissue alive

WORDS IN THE RIGHT ORDER (p.19)

1. The scientists have dubbed their creation Brainware.
2. It is in its embryonic stage of development.
3. It performs complex tasks such as voice recognition.
4. It could mean AI hardware uses far less.
5. We still have a long way to go.
6. These are artificially grown bundles of tissue.
7. Akin to those found in the human brain.
8. Researchers say their next step is to investigate.
9. It could lead to cures for neurological diseases.
10. One challenge for the researchers to find solutions.

MULTIPLE CHOICE - QUIZ (p.10)

1. c 2. a 3. d 4. b 5. c 6. b 7. d 8. b 9. a 10. d

ALL OTHER EXERCISES

Please check for yourself by looking at the Article on page 2.
(It's good for your English ;-)