

## Astronauts' brains change shape during spaceflight

5th February, 2017



Researchers from the University of Michigan in the USA have found that the brain of astronauts changes shape during spaceflight. It is the first study to look into how the brain changes on the journey into space. Researchers

looked at pictures of the brains of 26 astronauts who spent time in space. The photos were taken by high-tech medical machines called MRIs. Twelve of the astronauts spent two weeks as Space Shuttle crew members, and 14 spent six months on the International Space Station. All of them experienced increases and decreases in the size of different parts of the brain. The researchers said that the longer an astronaut spent in space, the bigger the differences in size were.

The research produced some interesting findings. The researchers explained that, "gravity is not available to pull fluids down in the body". This means there is a shift in the position of the brain inside the skull. The brain becomes either more squashed or bigger in size. The findings could help doctors in the future to treat problems that affect the brain's function. One possibility is to treat people who develop problems caused by long-term bed rest. Another possibility is to treat those who have a build-up of fluid in the brain, which can lead to brain damage. The researchers also say we will understand more about how neurons in the brain make connections. In addition, the findings will help future space travellers to Mars.

Sources: [futurity.org](http://futurity.org) / [nature.com](http://nature.com) / [inverse.com](http://inverse.com)

## Writing

What are the pros and cons of going to Mars? Would you like to go? Why?

## Chat

Talk about these words from the article.

brain / astronauts / journey / space / medical / increases / differences / size / interesting / findings / gravity / shift / position / function / possibility / fluid / journey

## True / False

- The research is from a university in France. T / F
- This is the second study into how spaceflight changes the brain. T / F
- Researchers look at photos of the brains of 26 astronauts. T / F
- A longer time in space meant smaller size differences in the brain. T / F
- A lack of gravity was one reason for the changes in brain shape and size. T / F
- This study could help people who have to stay in bed for a long time. T / F
- This research will not increase understanding about neuron behavior. T / F
- The findings will help humans on their journey to Mars. T / F

## Synonym Match

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

- |                       |                |
|-----------------------|----------------|
| 1. <b>found</b>       | a. heal        |
| 2. <b>look into</b>   | b. dimensions  |
| 3. <b>journey</b>     | c. underwent   |
| 4. <b>experienced</b> | d. liquid      |
| 5. <b>size</b>        | e. examine     |
| 6. <b>findings</b>    | f. comprehend  |
| 7. <b>shift</b>       | g. discovered  |
| 8. <b>treat</b>       | h. adjustment  |
| 9. <b>fluid</b>       | i. trip        |
| 10. <b>understand</b> | j. conclusions |

## Discussion – Student A

- What do you think about what you read?
- What do you think the speed of a space rocket would feel like?
- In what ways would you be a good astronaut?
- How important is space travel?
- What would you do if you went into space?
- What do you think life is like on the International Space Station?
- What do you know about the brain?
- What would you do with more brain power?

## Phrase Match

- |                                       |                          |
|---------------------------------------|--------------------------|
| 1. the first study to look into how   | a. of the brain          |
| 2. astronauts who spent               | b. size were             |
| 3. The photos were taken by high-     | c. interesting findings  |
| 4. decreases in the size of different | d. the brain changes     |
| 5. the bigger the differences in      | e. make connections      |
| 6. The research produced some         | f. tech medical machines |
| 7. there is a shift in the position   | g. of fluid in the brain |
| 8. treat problems that affect         | h. parts of the brain    |
| 9. those who have a build-up          | i. time in space         |
| 10. how neurons in the brain          | j. the brain's function  |

## Discussion – Student B

- What do you know about gravity?
- How can you keep your brain healthy?
- In what ways would you be a bad astronaut?
- How dangerous is space travel?
- What can go wrong with our brain?
- What do you know about neurons?
- What would it be like to go to Mars?
- What questions would you like to ask an astronaut?

## Spelling

- the enrjouy into space.
- high-tech ecmadli machines
- Space lhSeutt
- All of them ixcedeprne increases
- seaecresd in the size
- The essererhrca
- interesting nisingdf
- tviragy is not available
- pull siudfl down in the body
- becomes either more aesuhdqs or bigger
- Another iiltsypoibs
- rounnse in the brain

### Answers – Synonym Match

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

## Role Play

### Role A – Memory

You think memory is the most important brain function. Tell the others three reasons why. Tell them why their functions are not as important. Also, tell the others which is the least important of these (and why): creativity, social interaction or planning.

### Role B – Creativity

You think creativity is the most important brain function. Tell the others three reasons why. Tell them why their functions are not as important. Also, tell the others which is the least important of these (and why): memory, social interaction or planning.

### Role C – Social Interaction

You think social interaction is the most important brain function. Tell the others three reasons why. Tell them why their functions are not as important. Also, tell the others which is the least important of these (and why): creativity, memory or planning.

### Role D – Planning

You think planning is the most important brain function. Tell the others three reasons why. Tell them why their functions are not as important. Also, tell the others which is the least important of these (and why): creativity, social interaction or memory.

## Speaking – Brain functions

Rank these with your partner. Put the best at the top. Change partners often and share your rankings.

- |                      |                      |
|----------------------|----------------------|
| • Memory             | • Emotional response |
| • Creativity         | • Planning           |
| • Language           | • Learning           |
| • Social interaction | • Maths              |

### Answers – True False

a	F	b	F	c	T	d	F	e	T	f	T	g	F	h	T
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Answers to Phrase Match and Spelling are in the text.