

BRAIN AS A RENEWABLE RESOURCE



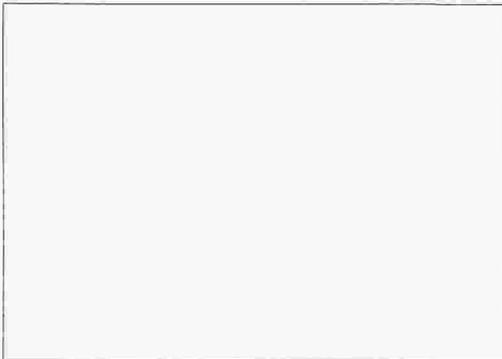
I. REFLECTING UPON THE BRAIN

Neurons are not usually replaced after damage. However, the following reading will tell you how mouse brain cells can be used to generate new neurons.

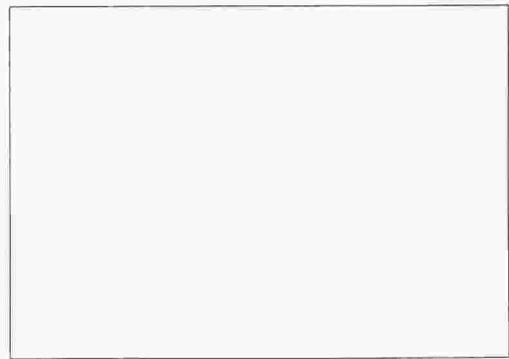
TASK A

Have you seen a representation of a neuron? If you have, draw one in the space given on the left. If not, try to imagine one and draw it in the space given on the right.

LEFT



RIGHT



After you have done your drawing, compare it with a classmate's. If nobody was sure about the shape of a neuron, you will be shown it when you read the text.

TASK B

Look at the five statements about the brain give below and then write them in the "**Sure**" or the "**Not Sure**" column, according to whether you are sure or not about them. Then discuss your answers with a partner.

HOW MUCH DO YOU KNOW ABOUT YOUR BRAIN?

1. Neurons can be replaced in the human brain.
2. Human brain neurons can be cultivated in laboratories.
3. The degeneration of the neurons in the human brain can cause diseases such as Alzheimer's, Parkinson's and Huntington's.
4. A neuron is a type of cell.
5. The nervous system can have up to fourteen thousand million neurons.

SURE

a.	
b.	
c.	
d.	

NOT SURE

a.	
b.	
c.	
d.	

TASK C

There are different ways of expressing "**Certainty**" or "**Uncertainty**". These are some of the most common ones. Try to use the expressions given below with information given in **Task B**.

1. I think that... **neurons can be replaced in the human brain.**

2. I am not sure if _____

3. I know that _____

4. I do not know if _____

5. I am sure that _____

6. I cannot say if _____

TASK D

The text you are going to read mentions three diseases which are related to brain problems: Alzheimer's, Huntington's, and Parkinson's. From the list below match each disease with its corresponding characteristics. Some of the diseases may share the same features. Use reference books or ask specialists on the subject if necessary.

CHARACTERISTICS				DISEASES	
	A	B	C		
1.	a	b	c	Peculiarity of posture	
2.				Convulsions	a. Alzheimer's
3.				Progressive loss of memory	
4.				Slowing of movement	
5.				Partial facial paralysis	
6.				Loss of concentration	b. Parkinson's
7.				Muscular rigidity	
8.				Muscular tremors	
9.			c	Change of personality	
10.				Dementia	c. Huntington's
11.				Loss of current memory	

II. FACE TO FACE WITH THE TEXT



TASK A

Read the article "Brain as a Renewable Resource" quickly, and then fill in the gaps using the words given.

types	neurons	treatment	implants
potential	species	products	conference

Brain as a Renewable Resource

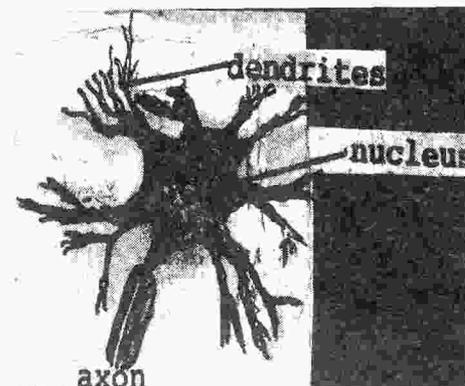
When Sam Weiss and Brent Reynolds discovered mouse brain cells that could produce new generations of neurons when they were cultured in the lab, the University of Calgary biologists hoped that their surprising finding might find a use in the treatment of neurodegenerative diseases (*Science*, 27 March, p. 1646). Now CytoTherapeutics, a Providence, Rhode Island, company that develops cell 1 _____ to treat diseases, has heightened that hope by signing an agreement with Weiss and Reynolds to probe the therapeutic 2 _____ of the brain cells.

Neurons are not normally replaced after damage. That is why the discovery that certain undifferentiated brain cells (called stem cells) could be induced to generate new 3 _____ was thrilling to the neuroscience community. If the cells can be encouraged to grow into the right neuron types, they could be used to replace dead neurons, or to provide substances the absent neurons would normally produce. And that would raise the possibility of a new treatment for diseases such as Parkinson's, Huntington's, and Alzheimer's—a 4 _____ that would not be dependent on the use of controversial fetal tissue transplants.

If similar neuron-spawning cells exist in adult human brains, they might be coaxed to differentiate right in their intracranial home, the Calgary duo suggests. If that effort proved unsuccessful, the cells might be removed, treated, and then put back into the brain. And even if the right cells aren't found in humans at all, cells from other 5 _____ might be used. In this scenario, though, the cells would be encased in a porous membrane, developed by the founders of CytoTherapeutics, that would allow them to secrete their useful 6 _____ and receive nutrients, while shielding them from the immune-system attack that normally kills foreign cells.

The Calgary biologists' findings are encouraging, says William Freed of the National Institute of Mental Health, who recently organized a 7 _____ on neural transplantation (*Science*, 14 August, p. 868). But Freed cautions that the researchers don't know yet whether the mouse cells form many or only a few neuron types, or whether the 8 _____ they do form will be the right ones for treating specific illnesses. "The promise depends on what you can get them to do," he says.

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This is a neuron

TASK B

When people write texts, they use words or expressions that help them to avoid repetition. Re-read the text carefully.

What do the following words or expressions refer to?

- | | |
|------------------------------|----------------|
| 1. Line 4: they | <u>neurons</u> |
| 2. Line 7: their | _____ |
| 3. Line 28: they | _____ |
| 4. Line 31: that | _____ |
| 5. Line 40: they | _____ |
| 6. Line 43: that effort | _____ |
| 7. Line 49: In this scenario | _____ |
| 8. Line 53: them | _____ |
| 9. Line 69: they | _____ |
| 10. Line 73: he | _____ |

TASK C

When you read a text, you find various visual elements that the author uses to highlight specific points, to clarify a concept, to provide bibliographic references, or to state a conclusion, such as parentheses (" "), quotation marks (" "), italicised words (*italics*), or underlined words (underlined).

What is the function of each of the following visual markers in the text?

LINE NUMBER	VISUAL MARKER	FUNCTION
10-11		Providing bibliographic references
22-23		
63-64		
71-72		

TASK D

1. Look back at section I, "**Reflecting Upon the Brain**", and at the text and then complete the table below.

**INFORMATION I KNEW
ABOUT THE TOPIC**
(Before reading the text)

**INFORMATION I DID NOT KNOW
ABOUT THE TOPIC**
(Before reading the text)

_____	_____
_____	_____
_____	_____
_____	_____

2. **ADDITIONAL INFORMATION I WOULD LIKE TO KNOW ABOUT THE TOPIC**

TASK E



LANGUAGE AWARENESS

1. "**Modal verbs**" or "**modal auxiliaries**" are characteristically used with other verbs to express tense. Modal verbs are followed by a verb in simple form, as in the example below.

For example:

"In this scenario, though, the cells **would** be encased in a porous membrane, developed by the founders of Cyto Therapeutics, that **would** allow them to secrete their useful products. . . foreign cells".

In both parts of the sentence the modal verb **would** is followed by the verbs **be** and **allow** in the simple form. There are five different modals in the text.

Read the text again and find four more different modals.

a.	Would
b.	
c.	
d.	
e.	

Notice that the modals have only one form for all persons.

For example:

- I **will** probably begin my research in two years' time.
- Sam Weiss and Brent Reynolds (**they**) discovered mouse brain cells that **could** produce new generations of neurons. . . (lines 1 to 5).
- Sam Weiss (**he**) **may** discover that mouse brain cells can produce new neurons.

2. Read the passage below called "**Brain Drain**" and fill in the gaps with these verbs:

- | | |
|--------------|-------------|
| a. depend on | d. join |
| b. travel | e. work |
| c. carry on | f. discover |

BRAIN DRAIN



A Colombian researcher who works in an American hospital might (1) _____ a substance to recover the memory in patients suffering from brain degenerative diseases. He is collating the latest research in the field. However, most of his research would (2) _____ recent studies made by a group of doctors at Hospital San Juan de Dios in Bogotá. He could either (3) _____ the Colombian task force or (4) _____ with his own team. If he joins the Colombian team he will (5) _____ to Colombia next month, if not he will (6) _____ his work in the United States.





III. JUDGING AND PROPOSING SOLUTIONS

TASK A

A CLEVER RESEARCH TEAM



You are one of the task force members in the case described below. After reading it, do the tasks that follow the text.

A research team of seven South American brain researchers want to propose a 5-year \$145 million programme to a multinational company. It is scheduled to start next year. It will cover aspects from basic neuroscience to clinical psychiatry, such as developing new substances for the treatment of Huntington's disease, using foetal tissue transplants or recording the behaviour of Alzheimer patients with the relatives' permission. Although starting this

type of project is difficult for Latin American countries, the research team members are optimistic about getting financial support. One of their reasons is that they have cleverly tried to make their proposal economically attractive by calling for most of the money to be spent on projects that would not only be of benefit to an academic research group, but which would also allow major pharmaceutical companies to develop new products.

1. Which are the main difficulties that the team might encounter in the development of their project?

- a. Bureaucracy.
- b. Competition with other projects.
- c. Exclusive patent for the manufacturer.
- d. Lack of advanced technology.
- e. Lack of goodwill towards multinational companies.
- f. Lack of up to date bibliographical resources.
- g. Lack of governmental support.
- h. Others _____

2. The topics below could be included in your brain research project. Tick the ones which might cause ethical problems and give your reasons for your choice.

- | | |
|--------------------------|---|
| <input type="checkbox"/> | a. Research on using foetal tissue transplants. |
| <input type="checkbox"/> | b. The testing of new substances with patients suffering from brain degenerative diseases. |
| <input type="checkbox"/> | c. The use of animals to carry out the research. |
| <input type="checkbox"/> | d. The production of substances essential to the survival of nerve cells. |
| <input type="checkbox"/> | e. The study of therapeutic substances to help patients suffering from Alzheimer's disease. |
| <input type="checkbox"/> | f. Developing new treatments for Huntington's disease. |
| <input type="checkbox"/> | g. Videotaping the developing stages of the disease in Alzheimer patients. |

TASK B

A CONFUSED BRAIN RESEARCHER



You are an ambitious young brain researcher in Colombia. You belong to a family with strong Catholic beliefs. A Californian university is offering you the opportunity to participate in an investigation into neuron cell transplants. After reading the proposal you become worried because the last part of your

letter says, "The task team is using foetal tissue for transplants."

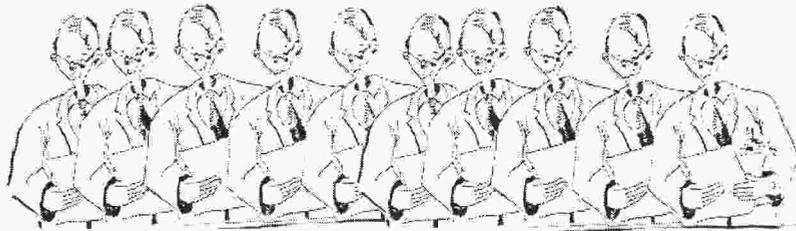
You are confused, but you have two alternatives. Either you accept the offer and forget about your principles, or refuse the proposal and wait for a second opportunity.

Get into groups of four students. One of you plays the role of the researcher and the others give him advice. Then, write down the researcher's final decision on the lines given.

I decided to _____
because _____

Or you may also state

My decision is to _____
because _____



SELF-EVALUATION FORM

- NAME OF THE ARTICLE: _____

- AUTHOR: _____

- SOURCE: _____ DATE: _____

- PURPOSE OF THE TEXT: _____

- KEY WORDS _____

- TASKS I LIKED BEST _____

- THINGS THAT I HAVE LEARNT: _____

- OPINIONS ABOUT THE TEXT: _____

- TOPICS I WANT TO GO INTO MORE DEEPLY: _____

- EXTRA ARTICLES I HAVE READ : _____

STRATEGIES APPLIED:

_____ Grouping

_____ Associating/elaborating

_____ Placing new words into a context

_____ Using imagery

_____ Semantic mapping

_____ Using keywords

_____ Recognizing and using formulas and patterns

_____ Getting the idea quickly

_____ Reasoning deductively

_____ Analysing expressions

_____ Transferring

_____ Summarising

_____ Highlighting

_____ Selecting a topic

_____ Using synonyms

_____ Organizing

_____ Planning for a language task

_____ Self-monitoring

_____ Self-evaluation

_____ Taking risks wisely

_____ Discussing your feelings with someone else

_____ Asking for correction

_____ Asking for clarification or verification

_____ Cooperating with peers

_____ Developing cultural understanding

_____ Becoming aware of others' thoughts and feelings

_____ Posing hypotheses

_____ Solving problems

_____ Making decisions