

# Biology

## Bridging Task (BT)

### Applications of Biology.

Choose one of the following—

- Lifestyles and Diseases
- Therapeutic uses of stem cells
- Uses of enzymes

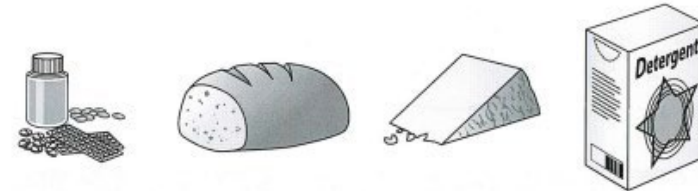
#### *Use of Enzymes in Industry*

The use of enzymes from bacterial and fungal cells has occurred for over a thousand years in processes such as baking, brewing and cheese-making.

Enzymes are very useful in industry due to some special features. They:

- allow reactions to occur at lower temperatures;
- are specific;
- can be used over and over again;
- can be produced in bulk, using micro-organisms.

Enzymes are used in a variety of processes, such as **food manufacture**, the production of **medicines** (pharmaceutical compounds) and **analytical** methods. There are hundreds of different enzymes that are used in many different commercial applications.



You may have carried out a number of practical investigations using enzymes during your biology course and may be familiar with the role of enzymes in breaking down large molecules.

#### **Task**

Research the commercial uses of enzymes, with one example from each of the following industries:

- Food industry
- Analytical sciences
- Pharmaceutical industry

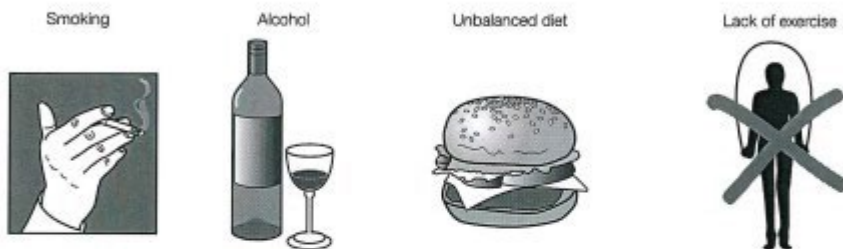
Prepare a poster, PowerPoint presentation or a leaflet that covers the following points:

- What example you have chosen and the reasons behind your choice.
- The substrates, enzymes and products involved in your choice.
- The key features of the enzymes chosen.
- A discussion of the importance of the commercial application of these enzymes.
- Explanations of any advantages and disadvantages in using these enzymes.

## Lifestyles and Diseases

Lifestyle choices have a great impact on individuals and on society. Lifestyle diseases are more evident, and occur more frequently, in industrialised societies. These diseases linked to our lifestyles are on the increase and there are now many campaigns highlighting the dangers and health issues linked with the different ways we live our lives.

Prevention is usually the best way to approach these problems and it is very important to make people aware of the consequences of an unhealthy lifestyle and the risk of many associated diseases. Some of the major factors that have had a dramatic impact on health over recent years include:



All these risk factors are linked to an increased chance of developing diseases such as lung cancer, coronary heart disease, liver cirrhosis and diabetes.

### Task

Write an informative leaflet highlighting the importance of a healthy lifestyle, that could be used as part of a healthy lifestyle awareness campaign in your school or college.

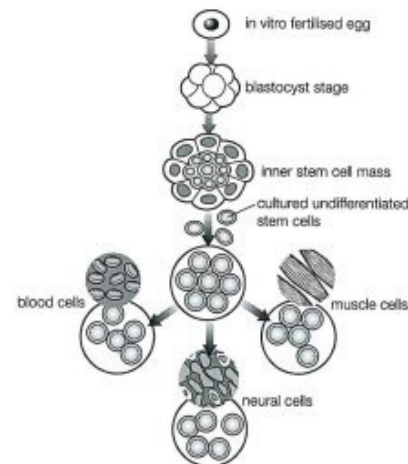
You should discuss a range of lifestyle choices and explain how they are linked to diseases. Your leaflet must include the following points:

- What is health and what is a disease.
- The effects of smoking cigarettes on the body (link this to some of the chemicals found in tobacco).
- How drinking alcohol affects your physical and mental abilities.
- What is an unbalanced diet.
- The links between high fats and cholesterol in diet and coronary heart disease.
- What are cardiovascular diseases.
- The benefits of regular exercise on the body.

## Therapeutic Uses of Stem Cells

Stem cells are special types of cells that have the ability to self-renew by mitosis and to differentiate. There has been great interest in stem cells due to their potential for tissue repair and for treating a range of degenerative conditions, such as multiple sclerosis and Parkinson's disease, where neurones and other cells in the nervous system have been damaged or have lost their ability to function. There is great potential to use stem cells to replace damaged cells.

Although most of the therapeutic uses of stem cells are at an early stage, many scientists and researchers believe that stem cell treatment will one day be able to cure many human diseases and relieve suffering.



### Task

Carry out research on the therapeutic uses of stem cells and prepare a presentation in the form of a poster or on PowerPoint.

Your presentation should cover the following points:

- What stem cells are and how they are different from body cells.
- Where stem cells are found.
- The difference between embryonic stem cells and adult stem cells.
- An explanation of the therapeutic use of stem cells in treatment of lymphomas.
- A discussion of at least three potential uses for this type of therapy.
- A discussion of any risks of stem cell therapies.
- Those who would benefit most from stem cell therapy.
- Why there are such varied attitudes to stem cell research.