At a glance

Alzheimer’s Disease (AD) is a form of dementia. It is a disease that affects the brain, causing the abnormal build-up of toxic proteins, which form plaques and tangles. These proteins damage neurones in the brain.

Researchers at the Alzheimer’s Research UK Oxford Drug Discovery Institute (ARUK ODDI) are working collaboratively with other centres around the country to study the role of proteins and cells in the brain, and develop drugs to treat AD.

In this activity students are presented with a possible idea for treatment. They study the mechanisms behind the development of AD in order to critique the idea, before developing their own.

Learning Outcomes

- Students analyse information in different forms in order to understand how AD develops
- Students use evidence to critique a scientific idea.
- Students generate their own idea, with evidence to support it

Each group of students will need

- Copy of student worksheet page 1 and 2
- Copy of student worksheet page 3 (optional)

http://www.oxfordsparks.ox.ac.uk/content/discovering-life-changing-dementia-treatments
Possible Lesson Activities

1. Starter activity
   - Ask the students if they know what Alzheimer’s disease is or what the symptoms are. They may have experienced a family member with the disease, so sensitivity is called for here. It is important to point out that it is not an inevitable part of ageing, it is a disease, so could be prevented or treated but currently there is no cure.
   - Play the animation ‘Discovering Life-Changing Dementia Treatments’, which outlines the causes of AD and the work going on in Oxford to help discover drugs to treat it.

2. Main activity: Causes of AD
   - Give each student a copy of page 1 of the student worksheet and ask them to read through it. This expands further on the information in the animation and sets the task.
   - Give students a copy of page 2 and access to the internet so they can view the Inside Alzheimer’s Disease video (see weblinks below). They should complete the flow chart to show the current thinking behind what causes AD and how it develops and spreads throughout the brain.
   - Discuss how interrupting some of these pathways can stop the progression of the disease. Answers are shown below.

   - Students then use this information to critique the idea presented on page 1 of the student sheet – to kill microglia cells in the brain.
   - An optional extra source of information is the conclusion from the journal review on page 3 of the student sheet. In order to access this, students may wish to first read through and highlight any words they don’t understand, before working as a group to look them up on the internet. They can then write a short conclusion of their own, summarising the information.
   - Ask for feedback from the class. They should realise that microglia cells have both a preventative and damaging role in the development of AD. In the early stages of the disease, the microglia cells play an important role in removing the damaging amyloid-β plaques, so killing them would increase the rate of progression. However, as the disease...
progresses they become detrimental. Students may suggest using the drug only in the early stages of AD, or would rather avoid this method altogether. They should use evidence to support their decision.

- Students then construct their own idea on a suitable target for drugs to help treat AD. They may wish to carry out research on the internet to help them.

3. Plenary

- Ask volunteers to share their ideas for drug targets with the rest of the class and ask others to critique them.

Weblinks

https://www.oxfordsparks.ox.ac.uk/content/discovering-life-changing-dementia-treatments

Oxford Sparks animation

https://www.youtube.com/watch?v=zTd0-A5yDZI

Inside Alzheimer’s Disease