Green fluorescent protein (GFP) stories

Suggestions of ways of using this resource:

Background

The discovery of the original green fluorescent protein (GFP) can be traced back to the early 1960s, when researchers were studying the bioluminescent properties of the jelly fish. Now GFP is found in laboratories all over the world where it is used in every conceivable plant and animal. The importance of GFP was recognized in 2008 when the Nobel Committee awarded Osamu Shimomura, Marty Chalfie and Roger Tsien the Chemistry Nobel Prize for the discovery and development of the green fluorescent protein, GFP. Using GFP you can see where and when proteins are made, and trace where they go.

The practical and the website

It might be possible to carry out the bacterial transformation practical prior to using the GFP stories. This practical is available from NCBE:

http://www.ncbe.reading.ac.uk/NCBE/MATERIALS/DNA/transformation.html

It is also highlighted on the SSERC website where you can also find a power-point presentation which can be used alongside the practical.

The idea behind most of the stories comes from this website:

http://www.conncoll.edu/ccacad/zimmer/GFP-ww/GFP-1.htm

Detailed background information and further website links can be found on the website.

The stories

Nine stories are available. Each story explains the way in which GFP is used by the scientists. Each story contains a web link and a starter question for the pupils to consider. Some of the stories are quite straightforward while others

are more complex. Teachers will need to choose the stories most suited to their class.

1. Working in groups the pupils are given a card containing the story. They are asked to read the cards and, where possible, look up the website link
2. Each group is then asked to explain their story to the rest of the class perhaps through a power-point presentation or using the story pictures which are also available. They might finish their presentation by asking the class the question posed on the story card
3. This activity could be a good starter activity, or training activity for the assignment
   (Sample pupil power-points are available from SSERC)

Teacher comments

I ran this activity with two classes at the end of term and it was really successful. One of the classes is quite reluctant to work (most of the pupils are not taking biology next year and they are all just tired) but even they put a lot of effort in and debated the issues with vigour.

The Fluoro fish and the glowing pigs case studies sparked considerable discussion. The class as a whole answered the questions posed: 'Is it morally right to produce glowing fish for fish tanks' and 'Why might Dr Whitelaw feel he has a moral right to try this technique?'

Fluorofish: the pupils came up with excellent reasons why it is morally right or morally wrong to make fluoro fish for sale as pets.

The glowing pigs debate became quite animated; some pupils felt it is ok to farm pigs for food but not to deliberately give them diseases just to help humans.