

Teaching ideas for Option D, *Medicines and drugs*

Questions

Two worksheets of questions are provided:

- the first worksheet deals with the Standard Level part of the syllabus
- the second worksheet is for Higher Level only.

There are also a large number of questions available in the Coursebook and on the accompanying CD-ROM.

Teaching ideas

- An important part of this option is recognising functional groups in organic molecules. Students should be reminded of the range of functional groups before starting this option.
- An excellent website that provides a student activity on drug design is:
<http://www.rsc.org/Education/Teachers/Resources/Design.asp>
- Students could research the safety of clinical trials in the light of one that went disastrously wrong:
<http://www.timesonline.co.uk/tol/news/uk/health/article702277.ece>
- The link between the acne drug Accutane (also known as Roaccutane and isotretinoin) and teenager suicide could be discussed.
- The cases in which strong and mild analgesics are prescribed could be discussed, as well as the abuse of substances such as heroin.
- The effects of the consumption and abuse of alcoholic drinks could be discussed. If ethanol were proposed today as a new drug, would it be licensed?
- The effects of caffeine consumption could be discussed with regard to consumption of soft drinks with a high concentration of caffeine ('energy drinks'). These drinks may either be drunk alone or mixed with alcohol.
- The problems with the over-prescription of antibiotics and the rise of 'super bugs' such as MRSA and *Clostridium difficile* could be discussed.
- The case for supplying antiretroviral drugs to third-world countries at affordable prices could be debated from the point of view of both AIDS patients and representatives of the major pharmaceutical companies. This could be linked to a more general discussion on generic drugs.
- The case of thalidomide in the 1950s could be researched, as well as looking at current uses of thalidomide.

Practical activities

Safety

Extreme care must be exercised when carrying out any practical activities in the classroom and a risk assessment should be conducted before carrying out the experiments.

Demonstrations

- The reaction between ethanol and acidified potassium dichromate(VI) (**Care!**) could be demonstrated. An alternative demonstration is described at:
<http://www.chem.umn.edu/services/lecturedemo/info/Breathalyzer.html>

Student practicals

- The acidity of various antacids can be compared by the method of back titration.
<http://www.bc.edu/schools/cas/chemistry/undergrad/gen/fall/Titration.pdf>
<http://www.drcarman.info/kem121lb/08lab121.pdf>
<http://www.usna.edu/ChemDept/plebeChem/manual/Ex17A%20Antacids.pdf>

ICT

There are many excellent websites available that are relevant to this topic. In particular, the use of databases to discover the structures and properties of drugs can be encouraged.

- Databases:
<http://www.drugbank.ca/>
http://dtp.nci.nih.gov/docs/aids/searches/active_compounds.html
http://dtp.nci.nih.gov/docs/3d_database/dis3d.html
<http://www.rxlist.com/script/main/hp.asp>
<http://www.drugs.com/>
<https://www.ebi.ac.uk/chembl/db/>
- Penicillin:
<http://videos.howstuffworks.com/science-channel/29783-100-greatest-discoveries-penicillin-video.htm>
<http://www.icyou.com/topics/health-wellness/penicillin-side-effects>
<http://www.nhs.uk/Conditions/Antibiotics-penicillins/Pages/Introduction.aspx>
<http://www.britishpathe.com/record.php?id=78077>
<http://vimeo.com/16736351>
<http://www.bbc.co.uk/learningzone/clips/fleming-and-the-discovery-of-penicillin/1837.html>
<http://www2.warwick.ac.uk/newsandevents/icast/archive/s2week20/>
<http://www.bbc.co.uk/learningzone/clips/sir-alexander-fleming-the-discovery-of-penicillin-signed/2081.html>
- AIDS:
<http://video.about.com/aids/How-AIDS-Affects-the-Body.htm>
- Analgesics:
<http://www.medicine.ox.ac.uk/bandolier/booth/painpag/acutrev/analgesics/leagtab.html>

Theory of knowledge (TOK)

The arguments about the cause of AIDS could be debated:

<http://video.google.com/videoplay?docid=-8142733917997460212#>