69P STUDENT EXERCISES THAT RESEARCH SOCIAL ISSUES OF PHARMACOLOGICAL RELEVANCE

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It is important to not only educate students in the discipline of pharmacology but also to teach them how to apply their knowledge of pharmacology to make value judgements such as the responsible use of drugs and also make pharmaco-economic assessments of the value of new drugs. As a component in a subject *Modern Drug Discovery and Development* that is taught to third year Bachelor of Science students majoring in pharmacology, we have formulated two assignments that challenge the students to make judgements on social issues relating to drug use. Students are required to search the topic using both Medline and the Internet to acquire background knowledge for making an informed decision.

The first assignment was to assess whether the provision of free or heavily discounted anti-retroviral drugs by the multinational pharmaceutical industry is the solution to the management of human immunodeficiency virus (HIV) infection in developing countries. This was a highly topical issue in 2001 due to the lawsuit brought by a consortium of multinational pharmaceutical companies against the South African Government that was buying cheap copies of patented anti-retroviral drugs for treating HIV-infected patients in South Africa from drug companies in India. Due to vocal protests in the developed countries about the actions of the pharmaceutical industry and also the defence by the Treatment Action Campaign in South Africa, not only was the lawsuit dropped but also the multinational pharmaceutical companies made anti-retroviral drugs available either without charge or heavily discounted in Africa. Students used the World Wide Web (www) to retrieve articles from leading newspapers such as *The Washington Post*, the *New York Times* and weeklies such as *Newsweek* and *Time* on this issue. More importantly, they used their pharmacological knowledge of anti-retroviral drugs to consider the problems with the correct use of triple therapy in countries with a scarcity of trained doctors and limited clinical services to monitor responses to the use of a complex cocktail of drugs. Students were required to write a 2,000-word report of the problems facing the correct use of triple therapy in developing countries even when the drugs are made affordable or free.

The second assignment addressed an opposing view that the spread of HIV infection in developing countries might be reduced more effectively and cheaply by the development of vaginal/rectal microbicides. Again, there is a wealth of information on the Web on this topic (www.microbicide.org; www.itg.be/micro2002) as well as reviews in the medical literature (Turpin, 2002). Students were required to write a report on the status of experimental microbicides; the problems with using such products and the pharmacoeconomics of the use of an effective microbicide in a developing country.

Students enjoyed these assignments and the challenge of applying their knowledge of the pharmacology of anti-retroviral drugs to important social issues.

Turpin, J.A. (2002) Considerations and development of topical microbicides to inhibit the sexual transmission of HIV. *Expert Opin Investig Drugs* **11**, 1077-1097.

70P AN INTERACTIVE CAL PROGRAM TO TEACH THE PRINCIPLES OF THE LABORATORY DETERMINATION OF RED BLOOD CELL INDICES AND THEIR USE IN THE DIAGNOSIS OF ANAEMIAS

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Over the last 15 years an increased awareness of the potential risks has led to the demise of using pin-prick blood samples from human (student) volunteers in laboratory practicals. While the manual methods of determining red blood cell indices have been replaced by automated systems they are still useful for teaching the principles. The computer-assisted learning (CAL) program described here attempts to simulate some of the procedures (e.g. counting cells on a simulated haemocytometer slide, measuring absorbance and calculating Hb concentration from standard curves). It also contains a case-based section to demonstrate how the use of red blood cell indices and other measurements can be used in diagnosis of common anaemias.

The program is aimed at undergraduates studying biological, medical or health sciences. It is written for Windows PCs (*Min. Spec:* Pentium P75, 8 Mb RAM, Windows 95 or later, double speed CD ROM, 14" colour monitor. *Preferred Spec:* Pentium P166 or higher, 16 Mb RAM, 8 speed CD ROM)) and is divided into three sections:
1. Red Blood Cell Indices - simulates the determination of: red blood cell count - simulated haemocytometry; haematocrit (PCV) - simulation of the use of an haematocrit reader; haemoglobin (Hb) conc. - simulated spectrophotometry including the construction of a standard haemoglobin curve. The *Methods Section* explains the principles of each method using a combination of text and imaginative graphics. Students can then simulate performing the tests on either a normal male or a normal female subject. This allows them to interactively obtain results for red cell count, PCV and [Hb] which may then be entered into a simple calculation program to give MCV, MCH and MCHC. The complete haematological profile may then be printed.
2. *Blood Groups* - explains the basis of the determination of ABO and Rhesus blood groups. Students observe the interaction of a blood sample (from a subject of unknown blood group) and known antisera (anti-A, anti-B and anti-D) and then select the correct blood group from a list of possible answers. Different blood groups are generated randomly and students can try as many examples as they wish. A record of their score is kept and displayed on-screen.
3. Anaemias - Nine case histories, each comprising: a brief medical history; haematological profile; peripheral blood film which indicates how this differs from normal blood; and the results of other relevant blood indices, are used to demonstrate how these can contribute to diagnosis of anaemias. Students must select an appropriate diagnosis initially from one of the four main types (iron deficiency, megaloblastic, haemolytic and aplastic) and then, with the aid of additional test results, to further define this by selecting one from nine possible diagnoses (enzyme deficiency, thalassaemia, haemorrhage, sickle cell, bone marrow aplasia, folate deficiency, hereditary spherocytosis, vitamin B12 deficiency, autoimmune (drug induced), iron deficiency).
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