Developing an interactive support database for pharmacokinetics teaching

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Pharmacokinetics

- Pharmacokinetics describe the interaction between an organism and drugs administered to it – *i.e. what the body does to the drug*
- It involves graphical representation of drug data and the use of complex mathematical expressions.
- The mathematical nature of the subject matter often means that clinical and pharmacological meaning is lost and student feedback suggests a lack of understanding.
- In pharmacology (clinical and basic), pharmacokinetics is a key aspect of the curriculum in terms of drug development, design and administration.
- The aim of this QAA enhancement theme: developing and supporting the curriculum funded project was to develop a database of interactive, intuitive and innovative resources to support student learning in this area.
- The grant was used to employ a student intern with recent pharmacokinetic experience (Shelby Barnett) to develop these resources.

Resource design

- A simple design involving a hierarchy of interlinking spreadsheets within Excel was chosen as this would be most flexible, accessible and compatible with the aim.
- By interlinking a variety of spreadsheet types (see below), an innovative and effective learning package was created:
  - Informative, well designed information sheets
  - Definitions
  - Flexible, interactive and complete learning package
  - Worked examples
  - Key point summaries
  - Practice questions
  - Clinical reflections

The database

- The main pharmacokinetic topics relevant for UG and PG students are covered in detailed sections:
  - Section 1 - Basic Linear Pharmacokinetics
  - Section 2 - Intravenous Infusion
  - Section 3 - Intermittent Intravenous Infusion
  - Section 4 - Multiple Oral Doses
  - Section 5 - Two compartment models
  - Section 6 - Non Linear Enzyme Kinetics
- Concepts are covered thoroughly, with full explanation of graphs, formulae, provision of worked examples, links to other topics and reminders against common errors all evident in the example below:

  ![](example_diagram.png)

- Precise relationships between parameters are summarised in clinical context using accessible and intuitive diagrams to enhance learning:

- Key definitions and equations are provided along with reference to practical clinical meaning:

- Students can check progress with interactive tests, provided to complement each topic area:

  ![](test_diagram.png)

- Currently available through University classroom PC access, work is underway to launch it through MyAberdeen.

- One of the original aims was to provide workbooks for students and the simplicity of the design means selected sections can be provided as a hard copy exercises as required.

Conclusion

- Feedback from the level 3 cohort given access suggest this is an invaluable resource.
- Overall, these interactive, student designed resources provide flexible, effective and independent support for pharmacokinetic students.