

BSc Pharmacology and Translational Medicine

Module: Principles of Pharmacodynamics and Pharmacokinetics

PBL Session: Analysis of Drug Transport Across Cell Membranes (1)

Date: Tuesday 11th October 2011

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(put "BSc Pharmacology" in the *Subject* field)

Solute carriers (SLCs) constitute a superfamily of proteins responsible for the transport of a wide range of substrates across cell membranes. There is considerable variation in the substrate specificity and type of transport between these proteins, but there are a number of similarities (hence their grouping into families).

The objective of this exercise is to conduct a basic scientific literature search on a single SLC protein, summarise the key points that describe structure, function and clinical relevance, and prepare a short presentation on the findings.

This will give all students the opportunity to engage with primary literature and experience in presenting work to peers – a key part of scientific discourse. It will also provide some foundation on research methods for the written assignment that forms part of the PDPK module, as well as an opportunity to improve presentation skills. Studying one SLC in detail and then comparing these details with those presented about other SLCs will reveal the main similarities and differences that exist within this superfamily of proteins.

Task

All students will be randomly assigned (in groups) a SLC protein to research during the "Work Alone Session" timetabled for 10:00 – 12:00 on 12th October 2011.

Discussion and work in small groups (3-4/group) is encouraged, but all students should contribute to the preparation and delivery of at least one group presentation.

The style of the presentation is free choice, but adherence to a relatively 'standard' format is advisable. Following each presentation, the group will be encouraged to ask relevant questions and contribute constructive feedback.

Presentations should be emailed to toby.athersuch@imperial.ac.uk by 09:00 on 13th October 2011 *and/or* brought directly to the PBL session that day on a USB device.

Each group will be given 5-10 minutes to deliver the presentation they have prepared. **Presentations will be given in the PBL session 14:00 – 16:00 13th October 2011.**

All presentations will be uploaded to the course Blackboard area for general reference as .pdf.

The task itself will not be formally assessed. It is a learning activity.

To allow members of the group to compare the different SLCs, please include the following information in presentations if possible.

- Name of protein
- Encoding gene
- Protein size / molecular weight
- General structure
- Tissue distribution
- Function / substrate(s)
- Indirect active transport / facilitated diffusion
- Uniport / symport / antiport + stoichiometry of transport
- Clinical significance of defects in transporter
- Modulators / inhibitors

Tips

Search PubMed (www.ncbi.nlm.nih.gov/pubmed/) for a concise review article of the subject area (e.g. protein family).

Read the review article through once (quickly) to get an overview of the topics covered and a feeling for the research area.

Make notes on the main points covered in the review article relevant to the task.

Identify the key pieces of important evidence that are cited in the review article and read the journal articles in these citations.

Reminder: The depth/detail of the presentation should be tailored to suit the time available. Leave sufficient time aside to put the slides of the presentation together and for a run-through.

Assigned SLCs

<u>Protein</u>	<u>Gene</u>
EAAC1	SLC1A1
GLUT1	SLC2A1
SGLT1	SLC5A1
GAT1	SLC6A1
Na ⁺ / Ca ²⁺ exchanger (NCX)	SLC8A1
Urea transporter	SLC14A1
MCT1	SLC16A1
RFT <i>or</i> RFC <i>or</i> FOLT	SLC19A1
OCT1	SLC22A1