

Learning Scenario 2. Systematic Review (Introduction) (module)

Introduction to Systematic Review and meta-analysis methodology for preclinical animal studies.

Animal experiments are ethically justified only if they are designed, conducted and analysed in such a way that they produce the most relevant and reliable information. If these conditions are not met, the laboratory animals are in fact wasted. A method to meet these conditions is a so-called systematic review. A systematic review is a structured and transparent method to thoroughly analyse previously conducted studies. In clinical research, systematic reviews are already common practice. In the field of animal experimentation, however, systematic reviews are still rather uncommon, even though recent publications have shown that they have several important advantages.

Systematic reviews help to improve the methodological quality of animal experiments, they prevent unnecessary (duplication of) experiments and they lead to an evidence-based choice of animal models. They improve the translation of animal data to the clinic, thereby increasing efficacy and safety of treatments in patients.

In this module, the basic principles, advantages and challenges of systematic reviews methodology for (preclinical) animal studies are taught.

Systematic reviews typically consist of the following steps:

- Formulating the review question;
- Conducting a comprehensive search to identify all relevant studies;
- Selecting relevant studies on the basis of explicit inclusion criteria;
- Assessing the methodological quality/validity of the included studies;
- Extracting data and perform a meta-analysis (an overall statistical analysis in which the results of individual studies can be combined);
- Interpreting the results.

During the Module students work on a group assignment, which results in a report and presentation.

Subject	Systematic Review (Introduction)
Author/owner/ possible copyright issues	SYRCLE, Radboudumc, Nijmegen, the Netherlands (www.syrcl.nl).
Topics	All steps of the systematic review methodology will be addressed including related topics such as randomisation and blinding and adequate reporting of animal studies.
Eligible student level	Bachelor, Master.
Teaching time	1 day per week for 10 weeks.
Examples of online teaching material	Video/webinar introduction to systematic reviews of animal studies, e-learning Module – systematic reviews of animal studies. Brightspace as online learning environment, for sharing and handing in group assignment.

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Examples of offline teaching material	<p>Each week the primary lecturer will introduce the students to the topic that will be covered that week and will discuss the progress during a face-to-face lecture.</p> <p>Depending on the topic other activities can be: (guest) lectures, group discussions, group assignments, etc.</p>
Helpful resources	<p>https://syrcl.ekphost.nl (registration code: Syrcle)</p> <p>www.brightspace.nl</p> <p>www.radboudumc.nl/SRtraining</p> <p>www.norecopa.no</p>
Licenses, certification or accreditation	<p>Students will receive a certificate of attendance.</p> <p>12 ECTs for Biomedical and biology students of the Radboud University.</p>
Integration in curriculum	<p>This module is integrated in the curriculum for biomedical and biology students of the Radboud University.</p>
Examination	<p>See weeks 9 and 10 under activities below.</p>
Aims and learning objectives / outcomes	<p>Explain the basic principles of the systematic review methodology.</p> <p>Explain factors in animal studies that can hamper interpretation, translatability and reproducibility.</p> <p>Explain how quality of reporting/design of animal studies included in a systematic review can influence the validity of that systematic review.</p> <p>Describe the most important advantages of and challenges for systematic reviews of animal studies.</p> <p>Know how to build a comprehensive search strategy in PubMed.</p> <p>Know how to perform and interpret an assessment of the methodological quality of animal studies.</p> <p>Know how to perform and interpret a simple meta-analysis of animal studies.</p> <p>Work in a group together on one project.</p> <p>Present work in an oral presentation for peers.</p> <p>Present group work in a written report.</p>
Activities/ programme	<p><u>Week and Activities</u></p> <p>Week 1 Introduction to the course (0.5h)</p> <p>Introduction to the systematic review methodology (1.5h)</p> <p>Introduction to group work assignment (1h)</p> <p>Self-study assignment 1 (1h)</p> <p>Work on group assignment (4h)</p>

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	<p>Week 2 Introduction to comprehensive search techniques (1h)</p> <p>PC practical on comprehensive search techniques (2h)</p> <p>Reporting and documenting a search (0.5h)</p> <p>Screening of search results + assignment (1h)</p> <p>Study characteristics + discussion assignment (0.5h)</p> <p>Reporting of animal studies (1h)</p> <p>Self-study assignment 2 (1h)</p> <p>Work on group assignment (1h)</p> <p>Week 3 Lecture on experimental design (2h)</p> <p>Practical on experimental design (2h)</p> <p>Work on group assignment (4h)</p> <p>Week 4 Lecture on Risk of Bias (1h)</p> <p>Practical on risk of bias (1h)</p> <p>Self-study assignment 3 (2h)</p> <p>Work on group assignment (4h)</p> <p>Week 5 Lecture data extraction and meta-analysis (2h)</p> <p>PC practical data extraction and meta-analysis (2h)</p> <p>Work on group assignment (4h)</p> <p>Week 6 Q&A group assignment (2h)</p> <p>Work on group assignment (6h)</p> <p>Week 7 Meet the expert: various guest lectures by experts from the field (8h)</p> <p>Week 8 Work on self-study / group work (8h)</p> <p>Week 9 Presentations group work assignment</p> <p>Group/self-study: writing final report</p> <p>Week 10 Written examination</p> <p>Deadline: handing in group report</p>
Assignment	<p>Lecture assignments: Most of the lectures contain a brief exercise e.g. quiz, discussion.</p> <p>Self-study assignments: Throughout the module, students will do self-study</p>

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	<p>assignments to prepare themselves for or recap topics covered during the module. In the programme it is specified which self-study assignment needs to be finished and by what time.</p> <p>Self-study 1: E-learning module systematic reviews of animal studies.</p> <p>Self-study 2: Prepare/read provided documents on randomisation and blinding (SOP's).</p> <p>Self-study 3: Risk of Bias assessment on topic of own choosing.</p> <p>Group assignment: During the module participants will prepare a systematic review protocol on a topic of their own choosing or can pick one from a list provided. Throughout the module they will incorporate the covered topics in their protocol and will discuss it peers and experts. At the end of the module, one participant per group will discuss their protocol to the entire class. The class will critically evaluate the protocol based on provided criteria.</p>
Student and teacher feedback	The module will be evaluated using student and teacher feedback which will be obtained by the curriculum administration.
Helpful Resources	