Quantification of translational success: rates of concordance between the results of animal experiments and human trials – A systematized review

Leenaars, CH[1,2,3], Menon, JM[2], Kouwenaar C[1], Stafleu FR[1], de Vries, RB[2], Ritskes-Hoitinga, M[2], Meijboom, FL[1].

[1] *Department of Animals in Science and Society - Human-Animal Relationship, Utrecht University, Utrecht, the Netherlands*
[2] *SYRCLE, Department for Health Evidence, Radboud Institute for Health Sciences, Radboud University Medical Center, Nijmegen, The Netherlands*
[3] *Institute for Laboratory Animal Science, Hannover Medical School, Hannover, Germany*

Background
Biomedical research investigates human pathology to develop new cures, but drug development is challenging. Candidate drugs that are successful in animal experiments often fail in clinical trials. One explanation is that the concept of animal-to-human predictability is fundamentally mistaken; this concept was never formally tested. An alternative explanation is that animal models can be predictive of humans, but that the quality of the experiments needs to improve to increase predictability. Both perspectives are currently defended by scientists arguing that translational success rates are (too) low.

Objectives
Several authors have addressed translational success rates. We are performing a systematized review to collect and describe the available aggregated quantitative data. We define successful translation as qualitative replication of results from animal experiments in human trials.

Method
Comprehensive searches in PubMed and EmBase were supplemented with reviewing reference lists and contacting content experts. We included papers that quantitatively compared the results of studies including at least 2 species with one being human, providing quantitative information on translation. The full protocol is available on www.syrcle.nl (Menon et al. 2017).

Results
Our searches retrieved 2649 references. After title-abstract screening, 160 remained, after full-text screening, 21. From the reference lists, we retrieved 13 more relevant papers. Content experts contributed at least 7 more.

Included papers comprise studies explicitly addressing translational success rates, but also correlational and meta-analyses including both human and animal studies. The full qualitative analysis of the included papers and the range of observed translational success rates will be presented at the conference.