

# INNOVATIVE ANIMAL-FREE TRAINING TO STEREOTAXIC NEUROSURGERY

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Stereotaxic neurosurgery in laboratory animals is a demanding technique used in a wide variety of studies in Neurosciences. Allowing to position one or more optical, electrical, or chemical probes, this approach remains indispensable for exploring brain functions. To date however, stereotaxic surgery is not taught as a subject per se, but rather passed-on behind closed door in research laboratories, resulting in a variety of practices and success rates. There is therefore a need to harmonize practices and enhance neuroscientists' abilities to explore the brain in a valuable and reproducible way.

Here we introduce an animal-free training on stereotaxic neurosurgery. The teacher/trainee ratio is 1:3 and, as a pre-requisite, trainees validate an online course on elementary concepts such as aseptic techniques, anesthesia and pain management, per-operative animal care, incisions and sutures (Vogt et al, 2011).

The course covers the theoretical background of stereotaxy and focuses on techniques and surgical approaches to optimize spatial precision, while minimizing the risks of irreversible harm to the animal. Anatomy and functional organization of the brain are reminded, with a peculiar attention to the 3-dimensional arrangement of brain blood vessels and ventricles. Hands-on practice includes exercises to acquire an ease in the manipulation of a stereotaxic frame, micropositioners, rulers and verniers. Instead of real animals, trainees use realistic high-resolution simulation devices to measure stereotaxic coordinates of cranial landmarks and entry points, and safely prepare the skull for the insertion and fixation of a probe. Exercises are repeated as needed and the accurate placement of a probe can be checked promptly without the need of histology. Tools and supports are made available for trainees to maintain their skills once back to their laboratory.

Really designed with the 3Rs' principle in mind, this course should contribute to promote more reproducible and compassionate approaches in animal research in Neuroscience.

Reference(s) :

Vogt, C., Gervasoni, D., Grezel, D., Morales, A. (2011) ALTEX. 28 (Special Issue):218.

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