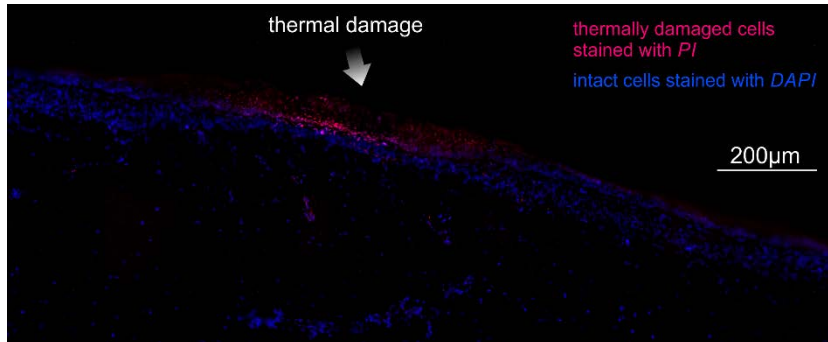




HNO-Klinik Abteilung Phoniatrie und Pädaudiologie
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Master Thesis
Molecular Medicine / Medical Engineering



Ex vivo test on bovine vocal fold after exposure to thermal damage

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Evaluation of mucosal reaction to laser irradiation

Background

As part of a DFG project, a multi-modal based high-speed laser endoscopy system is developed for imaging and reconstruction of the laryngeal anatomy and dynamics (i.e. vocal folds oscillations) for clinical application. The endoscope projects a laser grid onto the vocal folds from which the 3D surface is reconstructed. Sufficient visibility of the projected laser grid is a crucial aspect for efficient image processing. However, due to the lack of formal laser safety regulations on mucosal tissue, the current exposure limit, as approved for medical in vivo studies by the local Ethics Commission constitutes a generous estimation.

The aim of the master thesis is to ascertain the pathologic reaction of mucosal tissue to different types of laser irradiation and establish the foundation for a reasonable extension of the existing ethics vote. This is achieved by performing ex vivo experiments on excised cadaver larynges of calves. Until 6 hours posthumous, the effect of laser exposure on the cell structure can be evaluated with HE-staining of histological slices, which will be analyzed under a microscope. Supravital staining with 4',6-diamidino-2-phenylindole (DAPI), fluorescein diacetate and propidium iodide (PI) will be used to distinguish necrotic cells and tissue damage from cells with intact cell membrane. Following established laser safety guidelines for skin tissue, the reaction will be studied for different wavelengths, variable intensities and different exposure durations.

Requirements

- Basic experience with histological staining and microscopy is desirable, but not mandatory

Tasks/aims

- Dissection of ex vivo larynges
- Methodical execution of the laser experiments
- Cutting histological slices (optional)
- Staining slices and microscopic examination

Contact

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