Supervisor Name: Trung N. Le

Project Title: Treatment of cisplatin-induced hearing loss by the use of systemic antioxidant and manipulation of blood-labyrinth barrier.

Hospital/Research Institution: Sunnybrook Research Institute

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Field of Research (2 keywords): hearing loss, ototoxicity

Department: Otolaryngology Head & Neck Surgery

School of Graduate Studies Appointment (IMS, LMP, IHPME etc)? Yes/No: Yes
If YES, please name: IMS
**Brief Project Description (<300 words):**

Background: Cisplatin is a common chemotherapeutic medication used to treat many types of cancers worldwide. It has been shown to remain in the cochlea indefinitely, causing permanent bilateral hearing loss leading to social isolation, depression, and dementia. Our research has shown that mannitol can transiently alter the permeability of the blood-labyrinth barrier (BLB) and allow cisplatin to egress from the inner ear while protective antioxidant can enter. We hypothesize that administering mannitol and antioxidant after cisplatin chemotherapy can protect against cisplatin-induced hearing loss.

Objectives: 1) to optimize dosage and timing of mannitol for maximal BLB permeability, 2) to quantify cisplatin concentration in the cochlea after mannitol treatment.

Method: Established cisplatin chemotherapy paradigm will be given to different groups of rats. Mannitol and antioxidant will be administered at different concentrations and at different time points as delayed and additional treatments. Established auditory physiological tests will be performed before and at 1 and 2 months after. Histology of the cochlea will be studied for hair cell survival and cisplatin localization.

Student responsibilities:

- Assist in animal and drug administration
- Prepare histological samples
- Perform immunostaining, microscopy, and cell counting
- Data collection and statistical analysis
- Participate in weekly lab meetings