

Ph.d.

Growth of Vestibular Schwannomas Molecular Factors and Improvement of Treatment

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Vestibular schwannomas (VS) are benign tumors located at the vestibular nerve, originating from the surrounding Schwann cells. The majority of newly diagnosed patients enter a watchful waiting regime with yearly MRI scans. Identified continuous growth on follow-up MRI scans is the most frequent cause of active treatment, with radiotherapy or surgery. Presently, no clinical prognostic markers to determine the future growth of a VS exist. In the last decades, the VS incidence in Denmark has increased, while patients with a newly diagnosed VS have decreased hearing loss and decreased tumor size. However, around 50% of patients will lose serviceable hearing long-term, similarly to surgery.

To uncover and understand the molecular biology of VS growth would potentially enable us to perform precision-targeted medicine or target prognostic markers in combination with imaging, thus allowing us to perform active treatment in selected patients. In Paper I, we united the current knowledge regarding molecular factors with an impact on VS growth rate, and in Paper II and III, we performed global gene and miRNA expression profiling of VS regarding the growth rate. In these studies, we found pro-angiogenic, cytoskeleton remodeling, and pro-inflammatory factors to be the three responsible cellular processes for the growth rate of VS. In Paper IV, we found a significant 24% increase in the preservation of serviceable hearing when using a newly developed intraoperative neuromonitoring method.

The perspective of present findings is new molecular targets as prognostic markers for VS growth rate and better outcomes in hearing preservation surgery.

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