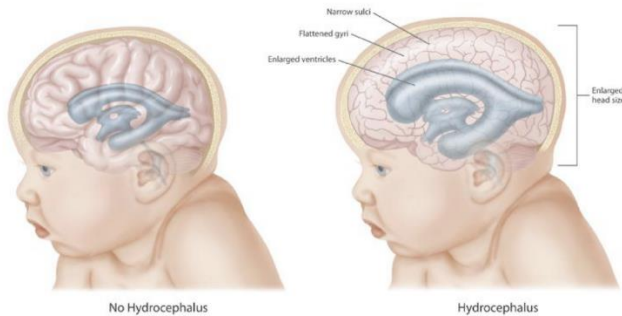


## Microwave Detection of The Shunt Malfunction in Hydrocephalus Children

### Background

Each year, around 300 children per



year are diagnosed with malignant tumors in Sweden. This type of tumor can lead to a condition named Hydrocephalus where an accumulation of cerebrospinal fluid (CSF) occurs within the brain. Hydrocephalus can be treated using a shunt catheter in the brain which drains away the CSF from the brain. The problem is 4 out of 10 shunts malfunction in the first year of the surgery. Therefore, the performance of the shunt needs to be monitored continuously. There are various ways to detect this malfunction and among them, Computed Tomography (CT) using X-rays is dominant which is ionizing radiation. Microwave Diagnostics methods can be a potential alternative to reduce the child's exposure to harmful radiation.

### Problem description



The goal of the project is to modify the MD100 system to be used in the diagnosis of malfunction of the shunt inside children' s heads. The project consists of designing and manufacturing the matching layer between the antennas and the head to fit the small child' s head. The project also includes the development of a diagnosis algorithm.

The project consists of 3 parts

1. Developing a data analysis method to detect the changes in the brain volume.
2. Production of matching media to modify the current system for children.
3. Design and experimental evaluation of the systems on phantoms.

**Target group:** TKTFY, TKELT, TKMAS, TKTEM, TKDAT, TKAUT, TKBIO

**Group game:** 3 - 6 students

**Number of groups:** 1

**Entry requirements:** Completed High Frequency Technology course is advantageous, but no requirement.

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(Supervisor and Examiner can be notified later when the projects are assigned)

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