

Type II Diabetes Detection in Magnetic Resonance Imaging

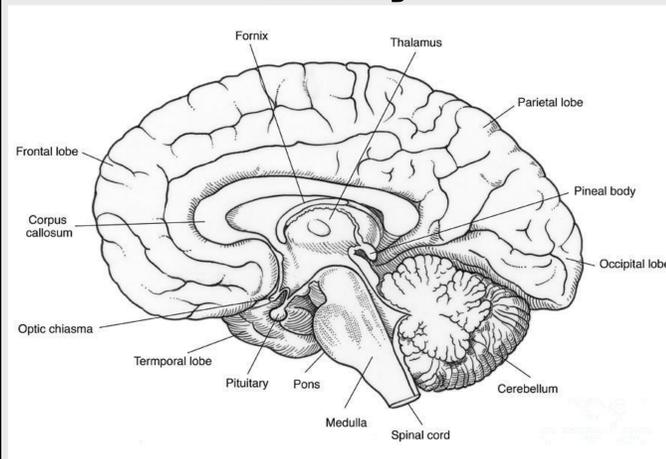
Introduction

Diabetes Mellitus is a disease that has affected the human population for many years. Medical imaging is useful for the next advancement on how to find a way to diagnose diabetes mellitus in its early stages.¹ Type II diabetes mellitus is typically unnoticed until physical symptoms are present. Visualizing signs and symptoms through MRI before physical symptoms, may be the next step in finding a cure for this disease.² These studies focus on the structures of the brain to assess changes as a patient develops type II diabetes mellitus.

References

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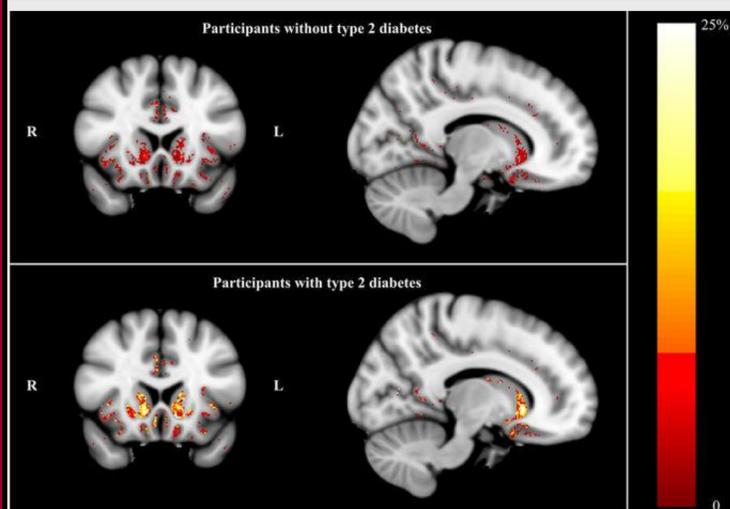
Anatomy



- In this image, the anatomy of the brain is presented in a sagittal view.
- These parts of the brain are familiarized in MRI studies, when an evaluation is needed to assess type II diabetes mellitus.

Signs Visualized in MR Imaging

Participants with type II diabetes and participants without type II diabetes showed how MR imaging can detect early physical changes within the brain. A T1 weighted image shows how cerebral blood flow is decreased by 25% in participants with diabetes mellitus, compared to participants



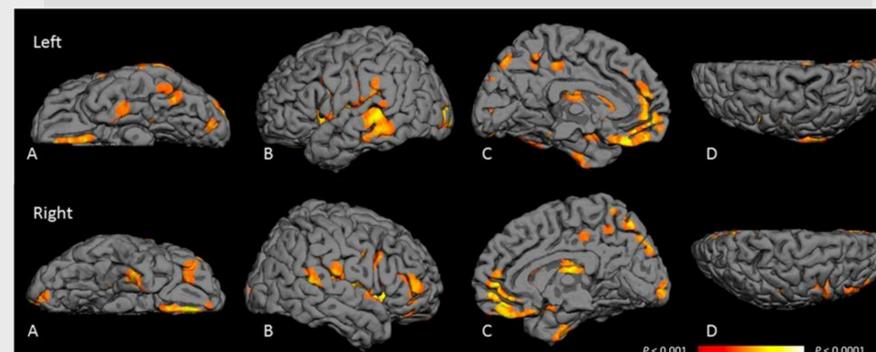
Brain Atrophy

The word atrophy is commonly used with patients who are diagnosed with type II diabetes.

- Atrophy occurs when tissue or organs decline in effectiveness due to cell degeneration

This image used MR imaging to analyze the probability of areas of brain atrophy in patients with type II diabetes mellitus.

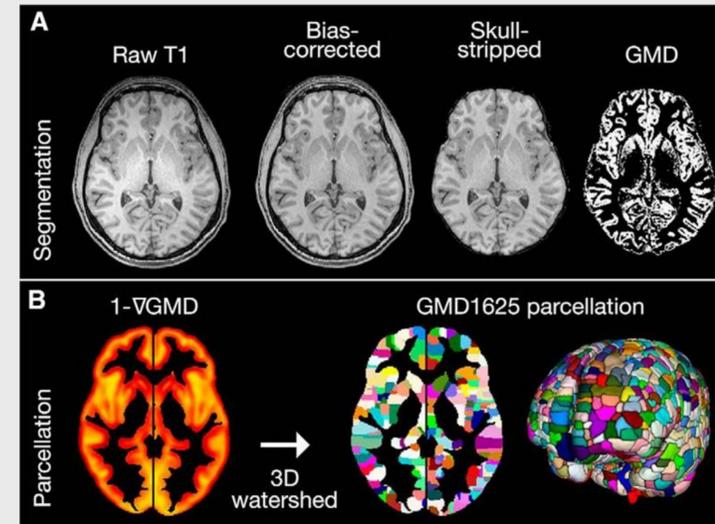
This study assessed brain volume in type II diabetes mellitus patients and found that their brain volumes were indeed smaller in the medial temporal lobe of the brain²



Magnetic Resonance Imaging

MRI is commonly used to differentiate between brain tissue thickness in patients with Type II Diabetes. This picture resulted in a procedure where multiple brain templates of the brain were needed to show how early diabetes affect the brain.³

- Raw T1- created to show the original template of the brain
- Bias- created of the whole head-to-head evaluation³
- Skull Stripped- created without the skull bone to visualize brain atrophy
- GMD 1625 Parcellation- visualizes the brain hemispheres, how diabetes affects neurological damage, and color-coded the diagram to help differentiate between the color peaks of damage³



Conclusion

Magnetic Resonance (MR) is a new way to help find early detections of Type 2 Diabetes Mellitus (T2DM). These studies focus on the structures of the brain, as well as other organs, to assess the changes as a patient develops T2DM. In T2DM, changes in cognitive functions are something to look for. MR imaging is a useful study in determining the structural changes. Early detections of T2DM with MR imaging has an opportunity to treat diabetes before severe damage of the body. Patients with T2DM has an increased risk for cognitive changes and dementia. It is an important factor for MR imaging to be able to find structural changes for diabetic patients between the stages of functioning cognition.