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Randomized Controlled Trial [Diabetes](#). 2015 Mar;64(3):1025-34. doi: 10.2337/db14-1000.

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Intranasal insulin enhanced resting-state functional connectivity of hippocampal regions in type 2 diabetes

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Abstract

Type 2 diabetes mellitus (T2DM) alters brain function and manifests as brain atrophy. Intranasal insulin has emerged as a promising intervention for treatment of cognitive impairment. We evaluated the acute effects of intranasal insulin on resting-state brain functional connectivity in older adults with T2DM. This proof-of-concept, randomized, double-blind, placebo-controlled study evaluated the effects of a single 40 IU dose of insulin or saline in 14 diabetic and 14 control subjects. Resting-state functional connectivity between the hippocampal region and default mode network (DMN) was quantified using functional MRI (fMRI) at 3Tesla. Following insulin administration, diabetic patients demonstrated increased resting-state connectivity between the hippocampal regions and the medial frontal cortex (MFC) as compared with placebo (cluster size: right, $P = 0.03$) and other DMN regions. On placebo, the diabetes group had lower connectivity between the hippocampal region and the MFC as compared with control subjects (cluster size: right, $P = 0.02$), but on insulin, MFC connectivity was similar to control subjects. Resting-state connectivity correlated with cognitive performance. A single dose of intranasal insulin increases resting-state functional connectivity between the hippocampal regions and multiple DMN regions in older adults with T2DM. Intranasal insulin administration may modify functional connectivity among brain regions regulating memory and complex cognitive behaviors.

Trial registration: [ClinicalTrials.gov](#) [NCT01206322](#).

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Figures

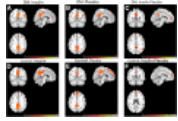


Figure 1 Resting-state functional network regions (MFC,...

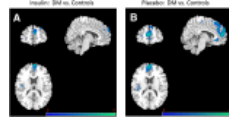


Figure 2 Differences in connectivity between the...

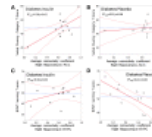


Figure 3 The relationship between functional connectivity...

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Gottschalk A, Ellger B.

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