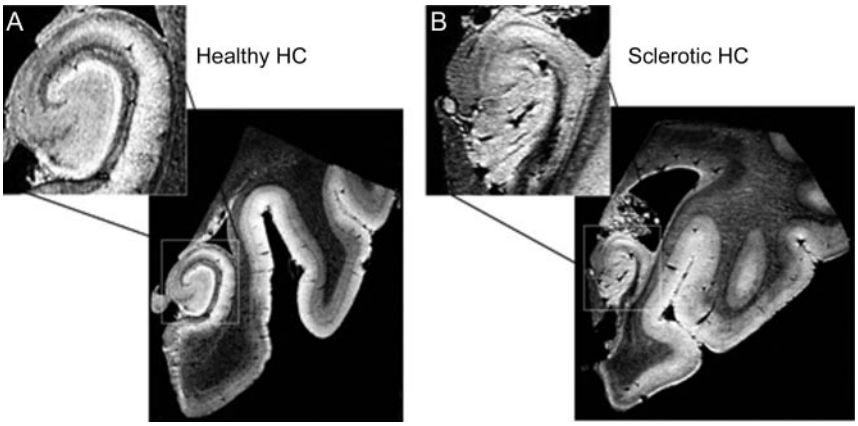
A novel approach to dementia

High-resolution ^{1}H MRI of the human hippocampus performed at 21.1 T

Figure 21.1-Tesla MRI on postmortem brain sections of the hippocampus



Fixed postmortem samples were washed in phosphate-buffered saline and immersed in Fluorinert (3M, Corp). Utilizing a 21.1-T magnet (Bruker Avance console and Micro2.5 gradients) and 33-mm birdcage coil, 3-dimensional ^{1}H fast low angle shot (FLASH) scans (echo time/repetition time = 12/50 msec) were acquired in 3-dimensional at 50-μm isotropic resolution over 4.3 hours at 14°C. (A) Normal hippocampal and (B) sclerotic sections.

Demonstrating the first high-resolution MRI of human hippocampal brain sections acquired at 21.1 T (900 MHz), this comparison presents hippocampal sections: a control (figure, A) vs a specimen with hippocampal sclerosis (figure, B).[1,2]

A 92-year-old woman showed steady cognitive decline with agitation and intermittent delusion (no seizures) over an 8-year period. Family history was positive for dementia (mother and sister). Despite marked dementia (Mini-Mental State Examination score 12/30), neurologic examination was negative. Pathologic evaluation revealed the diagnosis of hippocampal sclerosis (figure, B).

Control images display strong cell layer delineation, with hippocampal regions (CA 1-3) clearly visible. Sclerotic images lack hippocampal definition and display significantly reduced volume and cell layer compression.

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