Abstract

WATER-SUPPRESSED VOLUME-LOCALIZED PROTON FOURIER TRANSFORM SPECTROSCOPY IN VIVO

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Non-invasive Proton Fourier transform spectroscopy *in vivo* of low concentration metabolites is limited by the large water resonance. Volume localization is desirable *in vivo* to restrict signal acquisition to a specific region or tissue. Localization with surface coils does not completely localize the signal within deep tissues because surface tissues are detected, including subcutaneous fat which can substantially degrade the spectrum and complicate shimming. To overcome these limitations it is necessary to utilize both water-suppression and 3-dimensional volume localization, improving detectability and spectral resolution.

Water-suppressed volume-localized proton spectra allow observation of a variety of resonances, including lipids, N-acetylaspartate, lactate, amino acids, creatine derivatives and choline derivatives. The investigation of several well understood metabolic models in the rabbit brain can be used as a basis for characterization of corresponding changes in the NMR spectrum. Based on models of hypoxia induced ischemia, graded hypoxia, and hypoglycemia it appears that the proton spectrum is sensitive to changes in energy metabolism within the brain. Identification of specific compounds contributing to the creatine, choline, and lipid resonances is necessary to determine pooling of these compounds and their derivatives.