MICRO-MAGNETIC RESONANCE IMAGING OF RAT SKIN AT 21 TESLA

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Introduction

Micro-magnetic resonance imaging of skin samples has been shown to provide detailed information on skin structure and water diffusion in the hydrophilic regions of the skin (hair follicles and viable epidermis)[1]. Treatment of skin by electric fields[2] and chemicals[3] has also been shown by MRI to affect structure and water diffusion. The present work investigates the effects of organic compounds (hexadecane and jet fuel) on MRI observable parameters in skin at high field.

Experimental

Skin samples were prepared as in previous work [1-3]. MRI was performed using the 21 T MRI Bruker Biospin Avance spectrometer operating at 900 MHz for protons. Details are reported in [4].

Results and Discussion

Figure 1 shows processed images of untreated skin samples showing clearly, for example, the hair follicles (blue) and sebaceous glands (yellow) of the skin. Figure 2 shows that both chemicals increase T1 signal intensities in the skin and that jet fuel (JP-8) had the largest effects on the signals in the sebaceous glands, hair follicles, and epidermis.

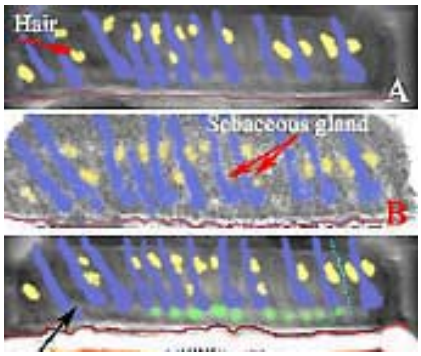

Figure 1. The comparison of different skin feature areas on T1 weighted (A), T2 weighted (B), and magnetization transfer MRI(C) images. The comparison shows epidermis, sebaceous glands (yellow) and hair(blue) are major features.

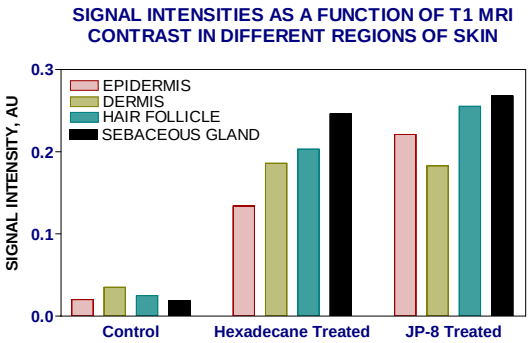

Figure 2. T1 MRI signal intensities before and after hexadecane dermal exposures.

Conclusions

MRI at high field may provide a tool to assess the effects of various chemicals on skin morphology.

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References

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