

# Sex differences in microstructure of white matter tracts in a birth cohort sample of young adults

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## Introduction

Sexual dimorphism of the brain is seen in differences in neural connectivity in white matter (WM)[1]. A major motivation for studying brain sex differences arises from sex related vulnerabilities to developmental and psychiatric disorders.

Studies using diffusion tensor imaging (DTI) have recently shown mainly more coherent diffusion, as higher fractional anisotropy (FA), and lower myelin or higher axonal caliber, as lower magnetization transfer ratios (MTR), in male vs female WM[2].

In this study, two modalities of magnetic resonance imaging - DTI and magnetization transfer imaging (MTI) - were used to collect data for the analyses of WM tracts of 450 participants from the Northern Finland 1986 Birth Cohort (NFBC 1986).

## Methods

Of the 9259 cohort members, 1344 were invited and 468 (34.8%) participated in the field study. DTI, MTI and structural T1 images were produced of 191 male and 259 female participants.

Group comparisons were made between male and female DTI based white matter skeletons and MTR maps using a voxel-wise permutation method.

## Results

Male FA was shown to be significantly higher than female FA throughout the WM ( $p < 0.01$ ). Also the comparison of the MTR maps showed significantly higher male MTR's in most WM regions.

## Conclusions

The results show large differences in comparison to most other studies, in the sense of high male vs female FA and MTR. One can argue that the finding arises from our relatively large sample size and high quality of data collection.

## References

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