A probabilistic atlas of the cerebellar white matter

*NeuroImage, September 2015, in press*

Kirsten van Baarsen
Neurosurgery resident
Radboud University Medical Centre Nijmegen
The Netherlands

ISPN Izmir October 2015
Acknowledgements

Michiel Kleinnijenhuis PhD
Stam Sotiropoulos PhD
Saad Jbabdi PhD
Anne-Marie v Cappelen v Walsum MD PhD
Andre Grotenhuis MD PhD
Cerebellar mutism syndrome

- 24% of children operated for cerebellar tumor (Robertson et al, 2006)
- No speech
- Normal language comprehension
- Pathogenesis?
- Anatomical substrate?
Hypothesis

Functional disruption of dentaterubrothalamic tract leads to cerebello-cerebral diaschisis and supratentorial hypofunction

Adapted from: Nieuwenhuys, Voogd and van Huijzen, 2008
Literature

Morris, 2009: VBSS

Soelva et al, 2011: volumetric analysis

Law et al, 2012: FA, MD, RD, AD
White matter atlases

MNI

Mori et al, 2008 (JHU)

Catani and Thiebout de Schotten, 2008
• 90 healthy subjects
• 25-35 years old
• 3T
• 270 directions
• 1.25mm isotropic voxels
• Tractography of SCP, MCP, ICP
ProbtrackX

Deterministic Tractography

Probabilistic Tractography

BedpostX
ProbtrackX
FMRIB Software Library (FSL)
ROIs

A. ROI’s for SCP
B. ROI’s for MCP
C. ROI’s for ICP
Average over 90 subjects
Future

Prospective study including pre- and postoperative diffusion weighted imaging
Thank you