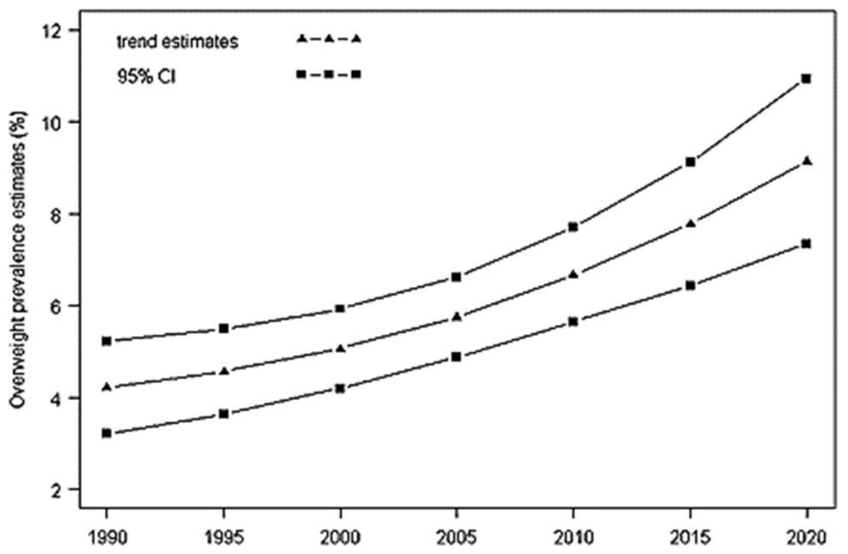
NEUROVASCULARIZATION AND TRACTOGRAPHY IN OBESE CHILDREN

Samoilova Y.G., Matveeva M.V., Oleinik O.A., Tonkikh O.S., Shuliko L.M.

Siberian State Medical University
Tomsk, Russia

Background:

WHO European Region
www.euro.who.int/obesity



GLOBAL PREVALENCE AND TRENDS OF OVERWEIGHT AND OBESITY AMONG PRESCHOOL CHILDREN

Am J Clin Nutr, Volume 92, Issue 5, November 2010, Pages 1257–1264

The aim: to analyze the association of cognitive functions and childhood obesity with differences in the structure of white matter and neurovascularization.

Materials and methods:

	AVERAGE AGE	♀:♂	AVERAGE WEIGHT (KG)	AVERAGE HEIGHT (M)	AVERAGE SDS	AVERAGE BMI (KG|M²)
Group 1 children with obesity (n=64)	14	32:32	63.75	1.705	2.8	27.3
Group 2 normal weight (n=54)		27:27	41.1	1.49	0.4	18.4

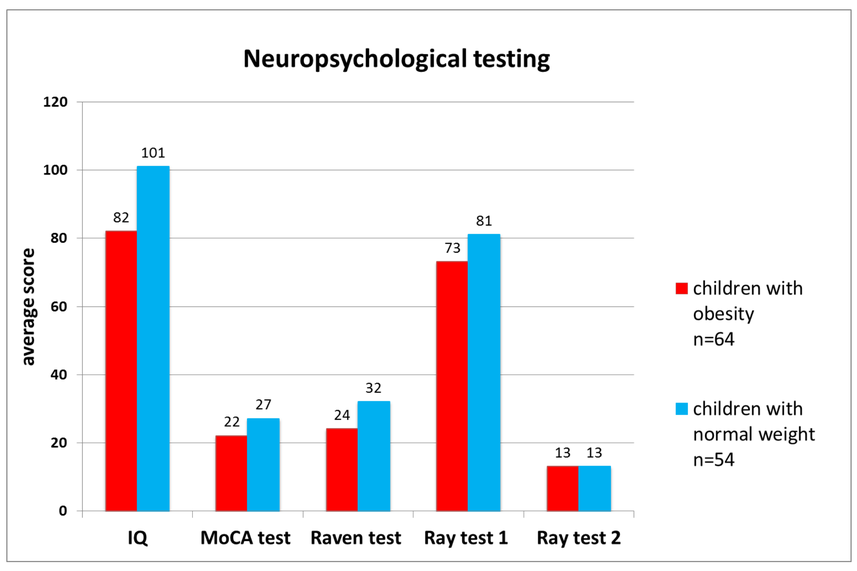
MAGNETIC RESONANCE IMAGING

- **Contrast less perfusion**
- **MR-tractography**

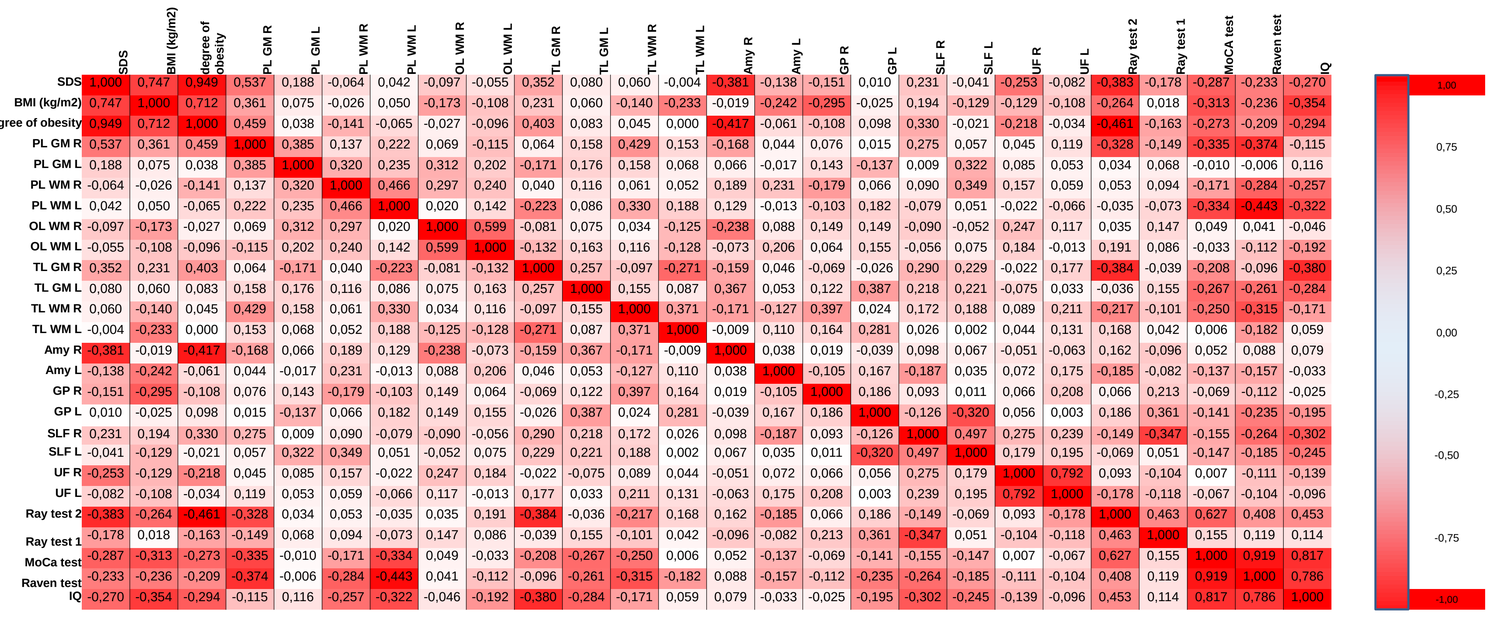
NEUROPSYCHOLOGICAL TESTING

- Raven's Progressive Matrices Intelligence quotient (IQ)
- Montreal Cognitive Assessment (MoCa)
- Ray test (1 and 2 versions)

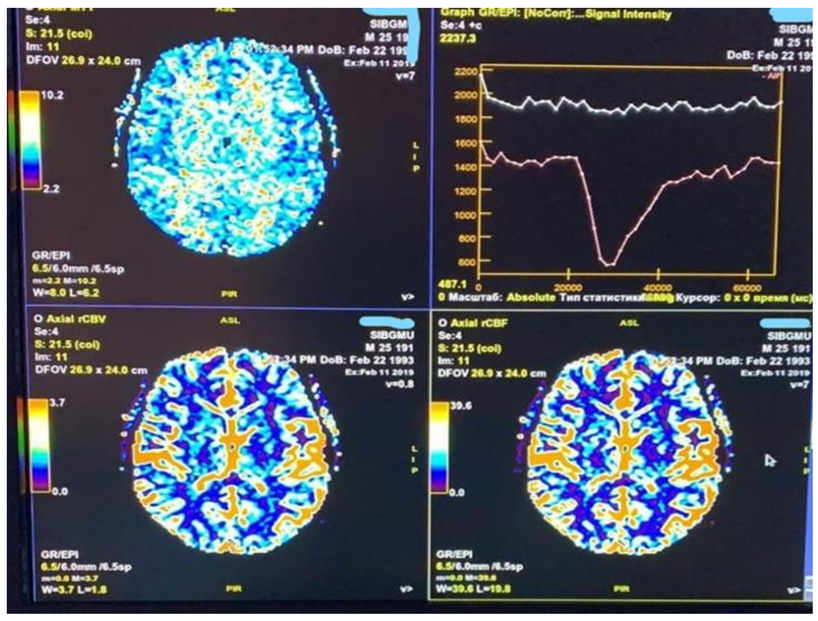
Results:



- Decrease in scores on the MoCA and Raven‘s tests, as well as IQ in obese adolescents ($p \leq 0,05$).
- In the two groups according to version 1 of the Ray test ($p \leq 0,05$).
- In the version 2 of the Ray test , the variants of the groups were comparable.



CORRELATION MATRIX OF BRAIN CHANGES WITH NEUROPSYCHOLOGICAL SCALES IN CHILDREN WITH OBESITY ($P \leq 0,05$).



BRAIN PERFUSION WITHOUT CONTRAST ENHANCEMENT IN CHILDREN WITH OBESITY

- Perfusion analysis: changes in vascularization in the left areas of the white matter reduction of perfusion in the occipital lobe and its increase in the temporal lobe area.
- MR- tractography of the white matter: a decrease in fractional anisotropy in the area of the hook-shaped beam on the right and left, and in the anterior and posterior adhesive pathways.

Conclusions: children with obesity had a violation of the integrity of the white matter and neurovascularization of the brain, which were associated with a deficiency of cognitive functions.