The Association of Self-reported Intake of Fat and Sugar with mRNA Expression of Dopaminergic Genes in the Blood

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'BRAIN LAB
THE INTERPLAY OF OBESITY AND THE BRAIN

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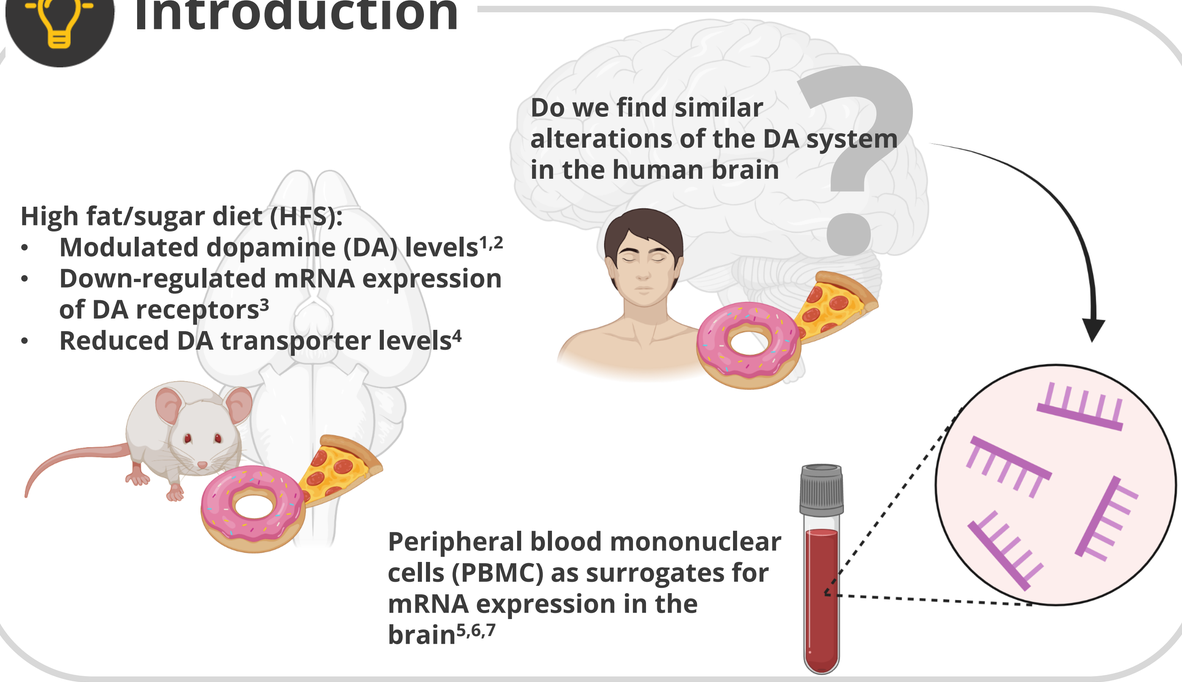
Introduction



Aims & Findings

We aimed to investigate whether:

1. **mRNA expression in PBMC differs between groups with low or high HFS intake**
2. **BMI is associated with mRNA expression**
3. **mRNA expression is associated with DA-dependent cognition**

Key findings

1. **mRNA expression of DAT and DRD3 differs between diet groups**
2. **BMI is negatively associated with DRD3 mRNA expression. BMI and diet interact for DRD2 mRNA expression**
3. **mRNA expression of COMT is negatively associated with working memory**

Methods

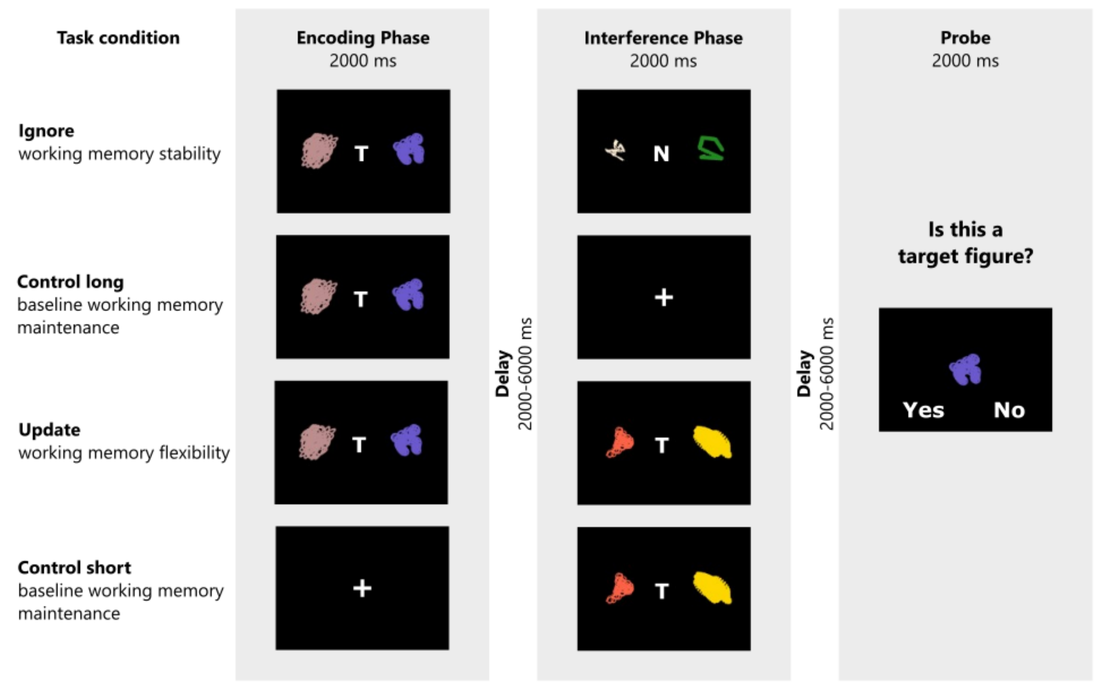
Participants

We grouped 68 healthy male participants based on their **self-reported intake of HFS**[8] into low (LFS) and high (HFS) consumers of HFS diet.

	LFS	HFS
N	33	35
	M ± *SD*	*M* ± *SD*
Age [years]	27.0 ± 4.5	26.5 ± 3.9
BMI [kg/m²]	24.3 ± 2.6	23.6 ± 2.06
IQ	109.5 ± 7.8	109.5 ± 6.3

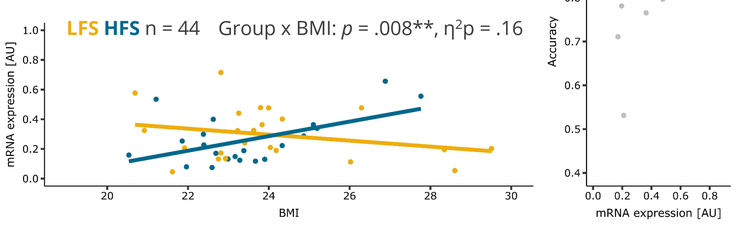
Working Memory Task

Participants performed a delay match-to-sample task, which taps into **working memory (WM) stability and flexibility**[9]. The task requires participants to encode target stimuli (signalled by the letter T) and compare those to a probe. In the **ignore** condition distracting non-target stimuli (signalled by the letter N) are presented. In the **update** condition target stimuli need to be replaced by novel targets and only the novel targets are compared to the probe.

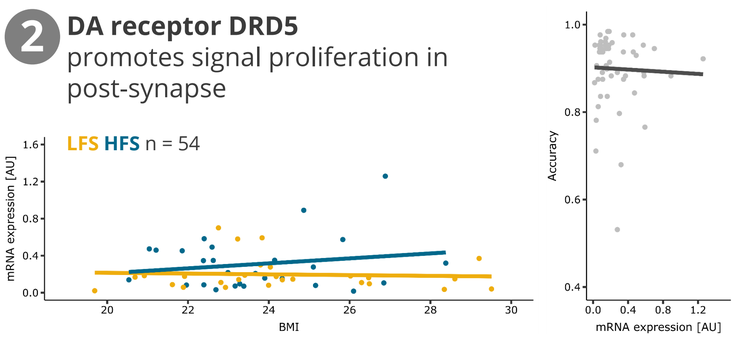


Results

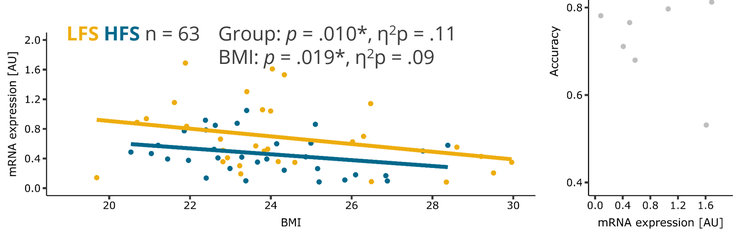
1 DA receptor DRD2
autoreceptor terminates presynaptic dopamine signal

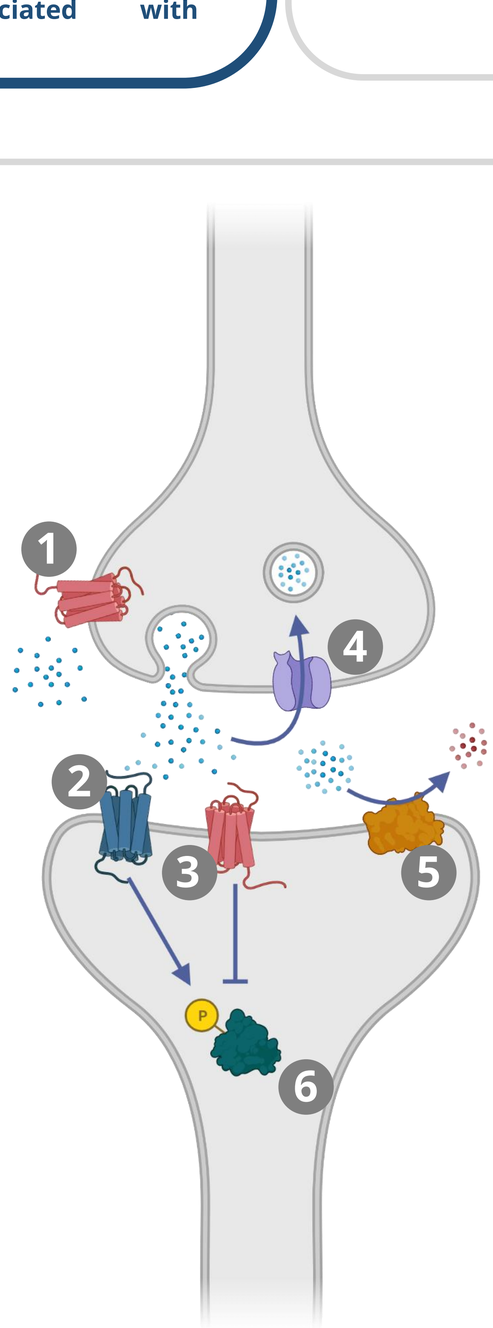


2 DA receptor DRD5
promotes signal proliferation in post-synapse

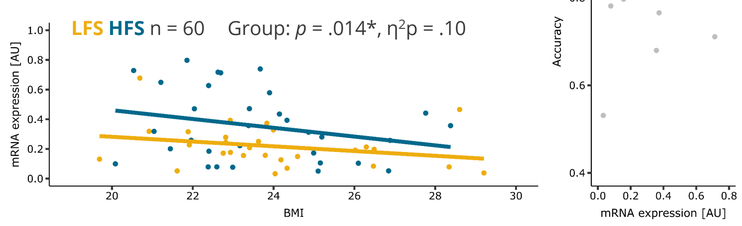


3 DA receptor DRD3
inhibits signal proliferation in the post-synapse

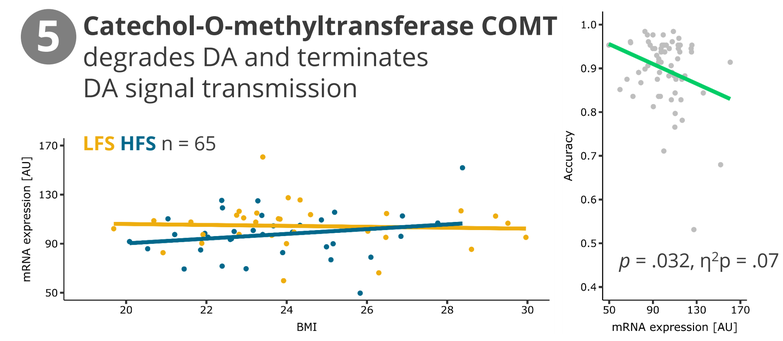




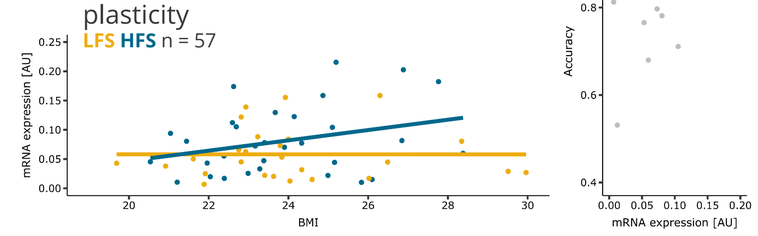
4 DA active transporter DAT
pumps DA out of synaptic cleft back into cytosol of synapse



5 Catechol-O-methyltransferase COMT
degrades DA and terminates DA signal transmission



6 DA and cAMP-regulated neuronal phosphoprotein DARPP-32
critical for DA-dependent synaptic plasticity



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