Lecture 1871

Behaviour in mice with different forms of BDNF knockouts

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Abstract Body

Neurotrophins, such as brain-derived neurotrophic factor (BDNF), play a major role in central functions of the brain. However, its role in the postnatal brain has remained difficult to assess, since the BDNF-null mutation is lethal (Rauskolb et al. 2010).

We therefore used five different groups of mice. Conditional knockout mice based on the cre/loxP-systeme with a C57Bl6/N background who display a lack of BDNF in NFL-expressing neurons ($BDNF^{fl/fl}$,cre^{+}) compared to their control littermates ($BDNF^{fl/fl}$,cre^{-}) as well as heterozygous knockout mice ($BDNF^{-/+}$,cre^{+}), their control littermates ($BDNF^{+/+}$,cre $^{+}$) and a mix between the strains of the conditional and the heterozygous knockout ($BDNF^{-/fl}$,cre^{+}).

Throughout life we measured weight and food intake of mice weekly and performed a battery of behavioural tests (van Gaalen and Steckler 2000) at three different ages. Novelty Induced Hypophagia in mice older than 12 months was performed to detect anxiety-related behaviour more specifically. Afterwards mice were perfused and brain weight as well as volume were measured.

$BDNF^{-/+}$,$cre^{+}$and $BDNF^{-/fl}$,cre^{+} became more overweight and ate more in coomparison to their controls. Additionally, those knockout mice behave different in most of the basic tests. Moreover, those knockout mice performed way worse in Novelty Induced Hypophagia.

Interestingly, differences in eating and basic behaviour between BDNF knock out mice and their control littermates increased with age. This may be due to the fact, that BDNF expression is highest immediately after birth and decreases with age. We suggest that young mice may cope better with a loss of central BDNF than old mice.

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