

ALCOHOL DEPENDENCE ACROSS THE BRAIN - from vulnerability to compulsive drinking

English abstract

In this dissertation we have tried to answer the questions how a vulnerability for alcohol dependence and the presence of chronic alcohol dependence affect the brain. We studied the influence of a family history of alcohol dependence and the influence of alcohol dependence itself on the brain by using magnetic resonance imaging (MRI).

We show that a family history of alcohol dependence affects local structure and function of the brain in healthy people and patients with depression and/or anxiety. Individuals who have not developed an alcohol dependence (yet), but who do have at least one first-degree relative with alcohol dependence, show smaller local brain volumes compared with individuals without an alcoholic family history. This may contribute to the vulnerability to develop alcohol dependence. In patients with depression or anxiety disorders, we show that the presence of a family history of alcohol dependence affects cognitive control functions and involved brain areas. However, we also show that the reaction to positive emotional stimuli is normalized. These results may contribute to a different symptom-profile of depression or anxiety under the influence of an alcoholic family history compared with depression/anxiety patients without an alcoholic family history.

In patients who suffer from chronic alcohol dependence, we see a shift from reward- or goal-directed towards habitual behavior. This is accompanied by increasing brain activation in regions that are involved in the performance of (inflexible) habits, and decreasing activation in regions that are involved in goal-directed behavior with longer lasting dependence. Additionally, control functions seem to be affected in severe and prolonged alcohol dependence. These results in alcoholics do not seem to be directly related with depression or anxiety symptoms. This pattern shown in alcohol dependent patients fits the hypothesis that long-term addiction is increasingly characterized by pathological habitual behavior, which further contributes to the chronic nature of addictions.