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Comparative meta-analysis of the neurotransmitter alterations by antipsychotic medications

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Schizophrenia as a prevalent disease plays an important role for the affected patients and their environment.
The objective of this meta-analysis is to characterize effects of acute administration of different antipsychotic drugs on extracellular neurotransmitter concentrations, especially Dopamine and Glutamate within the rat brain using in vivo microdialysis.
For our meta-analysis 8 antipsychotic drugs with different effective mechanism were selected to have an insight into the neurotransmitter alterations of different brain regions.
A total of 2905 rats were investigated in the experiments. For the statistical analysis the variables gender, age, strain, route of administration and state of consciousness are considered.
The results of this meta-analysis show a Dopamine release in Nucleus accumbens and Striatum for almost all of the selected 8 antipsychotics. However Clozapine and Aripiprazole provoke lower Dopamine release compared with the other antipsychotics.
In Prefrontal Cortex atypical antipsychotics like Clozapine, Risperidone and Olanzapine show higher Dopamine release than typical antipsychotics. This result can represent the property of atypical antipsychotics to diminish negative symptoms more effectively in contrast to typical antipsychotics.
Although dopaminergic dysfunction can explain a wide spectrum of schizophrenia's pathophysiology, the complete pathomechansim cannot be based on Dopamine transmission alone. In contrast to Dopamine glutamergic dysfunction can produce positive and negative symptoms equally. While the most antipsychotic-depending Glutamate levels behave similarly, Clozapine shows lower Glutamate release than Haloperidol. This aspect can be correlated with Clozapine's property of influencing as well dopaminergic as glutamatergic transmission.
This meta-analysis provides a reference for further experimental and in-silico studies concerned with psychiatric diseases.