An intravenous dose of amphetamine does not cause an endogenous opioid release in healthy human subjects.

10 healthy young men were investigated with [\(^{11}\text{C}\)]carfentanil PET in three sessions: at baseline, after placebo and after an intravenous amphetamine dose. The order of amphetamine and placebo was double-blind and randomized.

There were no significant differences in [\(^{11}\text{C}\)]carfentanil binding potential between amphetamine and placebo conditions in any of the investigated brain regions.

**Introduction**

There is ample evidence for the involvement of the brain opioid system in stimulant dependence. However, the opioid effects of an acute dose of amphetamine have not previously been studied in the living human brain.

**Hypothesis**

That an intravenous dose of amphetamine as compared to placebo would cause an endogenous opioid release in the human brain reward system, measurable as a reduction of the binding potential (BP) for the \(\mu\)-opioid receptor radioligand [\(^{11}\text{C}\)]carfentanil.

**Methods**

10 healthy young men were investigated with [\(^{11}\text{C}\)]carfentanil PET in three sessions: at baseline, after placebo and after an intravenous dexamphetamine dose of 0.3 mg/kg bodyweight.

The order of amphetamine and placebo was double-blind and randomized. PET was performed with a Siemens HRRT system and analyzed according to SRTM with striatum, prefrontal cortex, amygdala and hippocampus as regions of interest.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean BP (Ventral striatum)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>2.899</td>
<td>.431</td>
</tr>
<tr>
<td>Placebo</td>
<td>2.905</td>
<td>.424</td>
</tr>
<tr>
<td>Amphetamine</td>
<td>2.835</td>
<td>.426</td>
</tr>
</tbody>
</table>

**Results**

Amphetamine caused strong subjective effects in all participants. However, repeated-measures ANOVA revealed no significant differences in [\(^{11}\text{C}\)]carfentanil BP between treatment conditions in any of the investigated brain regions.

**Conclusions**

An acute, intravenous dose of amphetamine does not cause any significant opioid release in healthy human subjects.

This finding is in contrast with earlier animal experiments and points to the need for further investigations of the role of the opioid system in stimulant dependence.