

## Introduction

Coca-paste (CP) is an intermediate product of the cocaine hydrochloride (CC) extraction process, which is used as a smoked drug in South-America. CP contains variable concentration of cocaine base, and caffeine is one of the major adulterant. In humans, CP produces a fast stimulant effect, that is accompanied by cognitive alterations and sleep disorders.

## Aim

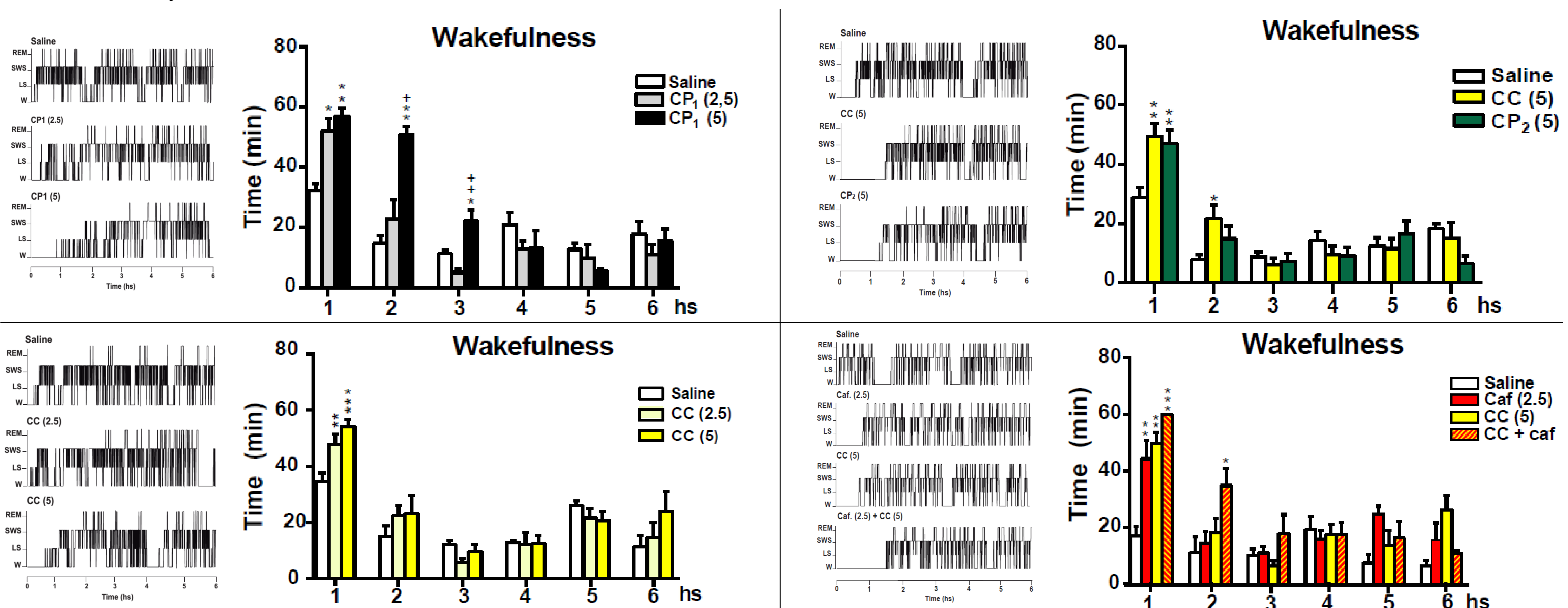
1. To analyze the acute effects on sleep and electroencephalographic (EEG) activity, of two CP samples (CP<sub>1</sub>, adulterated with caffeine; and CP<sub>2</sub>, without caffeine) obtained from local police seizures. The results were compared to equivalent doses of CC.
2. To analyze the effects on sleep of the combination of caffeine and CP at the same doses as present in CP<sub>1</sub>.

## Methods

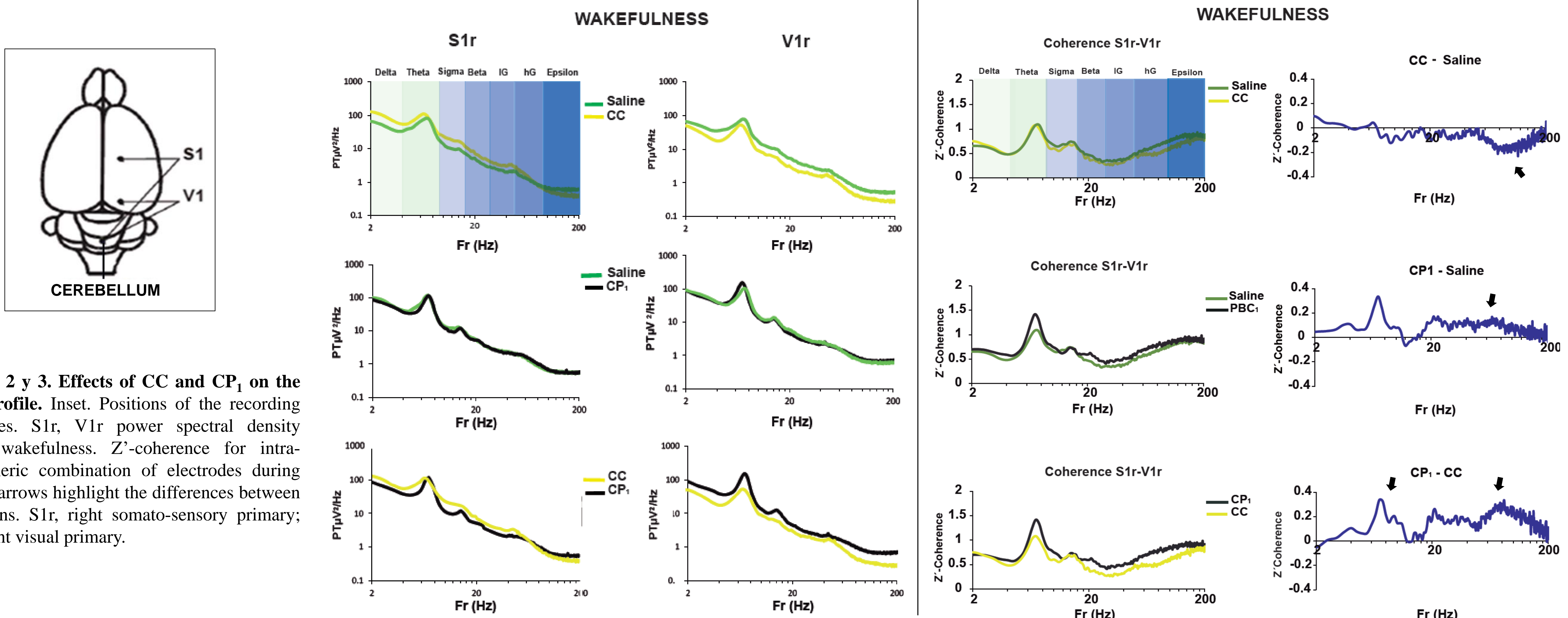
Rats chronically implanted for polysomnography, were recorded during 6 hours per session. The effects of systemic (i.p) administration of CP or CC on wakefulness (W) and sleep variables were analyzed. The spectral power and coherence of the EEG were also analyzed during W.

## Results

The animals treated with CP<sub>1</sub> showed a significant larger increase in W, as well as in REM and NREM sleep latencies, compared to CP<sub>2</sub> and cocaine. In addition, the combined treatment of cocaine and caffeine, as a CP<sub>1</sub> surrogate, mimicked the stimulant effect of CP<sub>1</sub>. Compared to cocaine-treated animals, the CP<sub>1</sub> increased theta, high gamma power and the coherence profile in most of the spectrum.



**Figure 1.** Effects of CC, CP<sub>1</sub>, CP<sub>2</sub> and the combination CC + caf. Left, hipnograms of representative animals. Right, Wakefulness time under different condition (hour per hour analyses). Data are expressed as mean ± SEM. One-way ANOVA followed by Tukey test. \* = denotes statistical difference vs saline, + = between CP<sub>1</sub>. \*\*p < 0.05, \*\*\*p < 0.01, \*\*\*\*p < 0.001.



**Figuras 2 y 3.** Effects of CC and CP<sub>1</sub> on the EEG profile. Inset. Positions of the recording electrodes. S1r, V1r power spectral density during wakefulness. Z'-coherence for intra-hemispheric combination of electrodes during W. The arrows highlight the differences between conditions. S1r, right somato-sensory primary; V1r, right visual primary.

**These data demonstrated that, when caffeine is present in the CP sample, the detrimental effect on sleep is larger compared to CC. In addition, CP<sub>1</sub> and cocaine produced different EEG profiles. These differences may be the foundation for the distinct cognitive effects induced by drugs adulterated with caffeine.**