PKCi/λ and PKMζ 's total and phospho protein expression in the Ventral Tegmental Area (VTA) and Nucleus Accumbens (NAc), after cocaine sensitization

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Chronic cocaine exposure produces enduring neuroadaptations in the brain's reward system. These alterations may underlie drug addiction's characteristic transition from casual to compulsive patterns of drug use. Some of these long-lasting changes may be mediated by the mechanisms of long-term potentiation (LTP); a heavily studied phenomenon thought to mediate memory. Persistent phosphorylation by protein kinase M zeta (PKMζ), an atypical isoform of PKC, mediates the maintenance of late-LTP. Recent studies have challenged the exclusive role of PKMζ in LTP and have suggested another atypical PKC isoform might also have a relevant role in LTP; PKCi/λ.

Our laboratory previously provided evidence that ZIP-susceptible LTP in the ventral tegmental area (VTA) and nucleus accumbens (NAc), participates in cocaine-behavioral sensitization. Here, we explored PKCi/λ and PKMζ protein expression profile following an acute cocaine exposure, 5 days of cocaine sensitization and cocaine withdrawal. Sprague Dawley Male Rats (250g) received intraperitoneal cocaine (15mg/kg) or 0.9% saline injections for 1 or 5 days and locomotor activity was recorded for 1hr. Rats were sacrificed at the end of their behavioral timepoint and tissue micro punches were obtained from the VTA and NAc. Protein extraction from these areas was followed by western blots for PKCi/λ and PKMζ total protein and phospho-protein. Results showed that PKCi/λ and PKMζ protein alterations agree with the known synaptic potentiated state of these areas at the different timepoints following the cocaine behavioral sensitization paradigm. Therefore, this data suggest that PKMζ might be a relevant protein for cocaine evoked LTP and also, a novel potential role of PKCi/λ in cocaine sensitization.