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**Title** Permanent and layer-dependent effects of prenatal cocaine exposure on dendritic morphology in the cerebral cortex.

**Text** We have previously characterized a rabbit model of gestational cocaine exposure in which permanent alterations in neuronal morphology, cell signalling and behaviour are observed. This model (using 3 mg/kg intravenous injections of cocaine, twice a day, during E16-E25) displays alterations in apical dendrite morphology in dopamine-rich cortical regions including anterior cingulate cortex (ACC). In the current study we analysed in greater detail the pyramidal cell morphology and spine density in upper and deeper layers of ACC in adult offspring exposed to cocaine in uterus. We therefore injected lightly fixed neurons intracellularly with Lucifer Yellow, and completely reconstructed them in 3-D with NeuroLucida software. We analysed 128 layer 3 and 5 pyramidal neurons from 6 cocaine- and 6 saline-treated rabbits, and have measured 21 morphological parameters that define the cells by complexity and size grades. These morphological analyses revealed basal differences between cortical layers, including soma perimeter, length of the apical dendrite, and dendritic spine density. We observed significant changes in the cocaine-exposed group compared to saline controls in basal and apical dendrite tortuosity of layer 3 and 5 pyramidal neurons, and in volume, surface and spine density of layer 3 pyramidal neurons. Moreover, differences between layers that did not appear in saline-treated animals, such as the basilar dendritic length and the apical ramification complexity, were detected in prenatal cocaine-exposed animals. These data support the presence of permanent morphological alterations in the ACC after a prenatal cocaine exposure, and suggest that these changes are differentially expressed by cortical layer. Since pyramidal cells located in different layers are involved in distinct neuronal circuits, these results suggest a different functional modification of circuits produced by cocaine.

**Theme** C - Disorders of the nervous system  
Addiction and drugs of abuse - Cocaine