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Biodistribution and preliminary therapeutic potential of CMCht/PAMAM dendrimer nanoparticles administration in rats

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The development of drug delivery systems (DDS) for targeted intracellular delivery of therapeutic agents has been attracting great deal of attention. In traumatic central nervous system conditions, where therapies have been revealing to be highly inneficient and non-specific, these targeted DDS could be highly beneficial. We have previously shown *in vitro* studies where the carboxymethylchitosan (CMCht)/ poly(amidoamine) (PAMAM) nanoparticles (NPs) were able to be uptaken by different cell types (neurons and glial cells), while not evidencing any cytotoxicity. In the present study, *in vivo* biodistribution of the CMCht/PAMAM NPs was investigated. Following intravenous injection in adult male Wistar rats, the NPs showed to be stable in circulation and able to be internalized by cells from different tissues (e.g., brain, liver, kidney and lung). Afterwards, methylprednisolone (MP)-loaded fluorescently-labelled NPs were administered in the cerebrospinal fluid of the cisterna magna of adult male Wistar rats. Upon the intracisternal injection, NPs were detected throughout the cortical and parenchimal areas of the brain, namely in the prefrontal cortex, hippocampus and periventricular areas after 24 h. More recently, ongoing studies are focusing on the therapeutic value of these methylprednisolone-loaded NPs administered following a spinal cord lesion in rats. Significant differences in the BBB locomotory test were found in MP-NPs treated rats 1 month after injury.

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