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Targeting of salicylate to skin and muscle following topical injections in rats

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The process of systemic absorption and tissue targeting efficacy of salicylate (SA) following intracutaneous (i.c.), subcutaneous (s.c.) and intramuscular (i.m.) injection of its sodium salt in rats were evaluated by determination of the drug concentration in the injection site and surrounding tissues. After i.c. and s.c. injection, SA was absorbed into the systemic circulation from the muscular vessels as well as the cutaneous or subcutaneous vessels beneath the injection site, and the AUC of the drug in the muscle was extremely high. Following i.m. injection, SA was rapidly absorbed into the systemic circulation mostly from the muscular vein. These results suggested that i.c. and s.c. injections have high degrees of targeting efficacy to the muscle, whereas i.m. injection is not appropriate for drug retention in muscle. In contrast, most of the topically applied drug was absorbed from the cutaneous vessels, and little drug migration to the muscle was observed. Thus, the skin pharmacokinetics of SA after i.c. injection were also markedly different from those after topical application on the skin. These results suggested that the i.c. and s.c. injection may be good means to improve targeting ability of drugs to muscle as well as skin.