Synergetic aspect of endovascular administration and immobilization of substances in polymeric microcapsules in targeted delivery.

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Efficient targeted drug delivery in the kidney with reduced side effect is a need to minimize spillover and/or drug accumulation in other tissues and organs. The suggested method involves the injection of a drug incorporated into polyelectrolyte capsule in order to localize carriers with following degradation and release in kidney's capillaries for several hours after administration through the renal artery without its disruption (puncture). In this study, we compared the effect of microcapsules' administration of various sizes and dosages. The study using RSOM, OCT, and laser speckle contrast analysis system revealed perfusion disorders of the target organ after the introduction of an unsafe dose of microcapsules. The location of designed carriers in the vessels of the kidney was studied in dynamics using CLSM of the organ cryosections. Mechanical retention in capillaries and slow impregnation into surrounding tissues during the first 1-3 hours provide the advantage of injection of high molecular weight substance in microcapsules over free form. The possibility of complete "self-cleaning" of the capillaries in 6 hours with the administration of a safe dose of capsules has also been shown. A biodistribution and redistribution study via IVIS confirmed the effectiveness of BSA-Cy7 encapsulation for long-term accumulation in the target organ. This study was supported by the Russian Scientific Foundation (RSF grant 23-75-10070).