



MACROMOLECULAR DRUG CARRIERS WEIGH-IN TO TARGET TUMORS

A new study sheds light on how the size of a polymeric drug carrier can affect its success in delivering cancer drugs to solid tumors. The findings may lead to new ways of targeting tumors with anti-cancer drugs. The study was partly funded by the National Institutes of Health's National Institute of Biomedical Imaging and Bioengineering.

“The findings of this study are important because they can be used to optimize delivery of all macromolecular therapeutic agents, including cytokines, antibodies, and antiangiogenic drugs that are gaining importance as therapeutic agents,” said Ashutosh Chikoti, Ph.D. and colleagues of Duke University in Durham, North Carolina.

In a recent study reported in the *Journal of the National Cancer Institute*, researchers investigated how molecular weight influences the accumulation of a model macromolecular drug carrier, called dextrans, in mice carrying a squamous cell carcinoma tumor. They tested a range of fluorescent-labeled dextrans, with molecular weights from 3.3kDa to 2MDa, which were intravenously administered and visualized with intravital microscopy.

The authors found that the largest molecules did not penetrate far into the tumor, but accumulated to the highest extent. Smaller molecules penetrated farther into the tumor, but did not accumulate to the same level as their larger counterparts. However, shallower penetration may be an advantage because it would concentrate these molecules near the vascular surface, where cancer cells proliferate most rapidly. Dextrans accumulated optimally in tumors at weights of 40-70 kDa. This information may be used for optimizing macromolecular carriers to target tumors in the future.

The researchers plan to exploit the information gained from these studies to design macromolecular drug carriers that can precisely target the tumor vasculature by modulating the molecular weight of the carrier.

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Reference: Dreher M R, Liu W, Michelich C R, Dewhirst M W, Yuan F, Chilkoti A. Tumor vascular permeability, accumulation, and penetration of macromolecular drug carriers. *J Natl Cancer Inst* 2006;98:335-344.