InSyTe FLECT/CT Application Spotlight

Drug Delivery

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Authors: Sun T et al.
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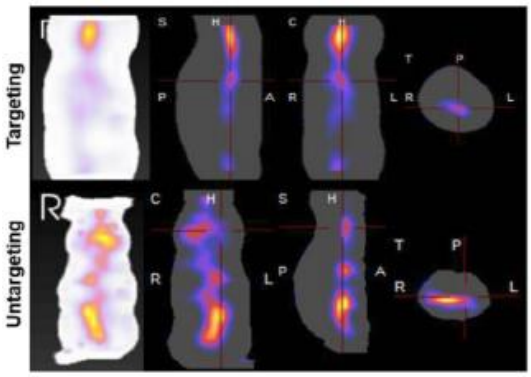
Summary: Drug concentration in tumor tissues is often the most important marker in determining the therapeutic efficacy of a cancer treatment. The development of real-time information on time/localization/amount of drug release occurrence has been a large focus of recent novel therapeutic techniques. In addition, techniques to develop theranostics have resulted in complex molecules that have multiple properties that engage in therapy and real time diagnostic capabilities. In this application spotlight, a team of researchers in China report on a molecular shuttle, comprised of nanosized artificial molecular machine that has properties to specifically target the tumor, also can be converted into a drug that releases strong NIR fluorescence signals. This in turn allows for the molecules to be observed and tracked using the optical imaging systems upon conversion into the active drug state. This group of researchers then utilized the InSyTe FLECT to provide real time information on prodrug reconversion and spatio-temporal distribution inside the different organs in the animals.



The authors used the InSyTe FLECT to assess localization of the molecular shuttle in a preclinical model of breast cancer. The figure on the left, taken 12 hours after injection, demonstrates the InSyTe FLECT capabilities of enabling 3D visualization of the DDC distribution and accumulation in the animal. The resulting activation of the drug into the "on" state results in accumulation of the molecular shuttle seen by high intensity values in the Untargeting image panel.

InSyTe FLECT Spotlight: Using the InSyTe FLECT, the research team was able to visualize accumulation of the molecular shuttle *in vivo* 12 hours post intravenous injection. The research team also visually confirmed with the InSyTe FLECT that the molecular shuttle was able to successfully deliver and release both the drug and fluorescent dye in the tumor. Furthermore, the research team used the FLECT modality to visualize an increasing fluorescence emission from the tumor site over a 24 hour period, indicating drug-release viability and the efficiency of activation of the drug component of the shuttle.