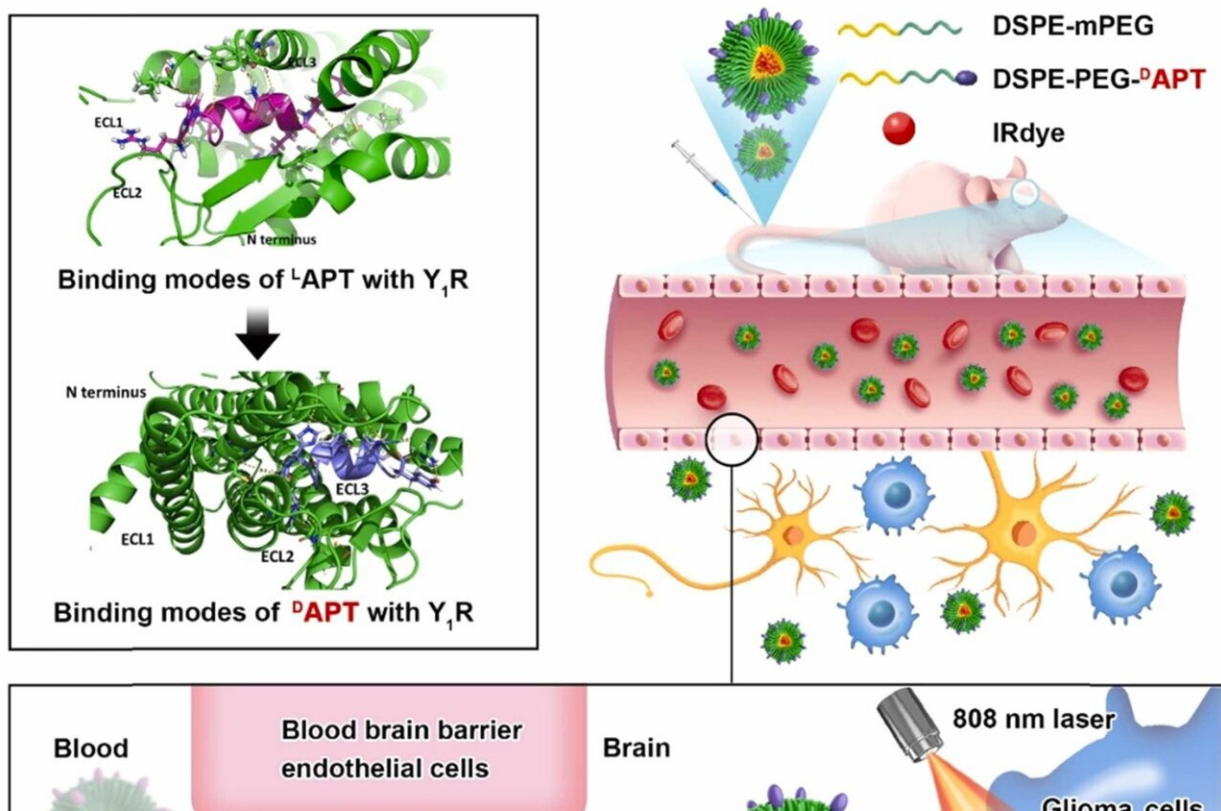


D-peptide ligand of Y1 receptor developed for targeting gliomas

May 11 2022, by Zhang Nannan



The D-peptide ligand of Y1 receptor serves as nanocarrier crossing the blood brain barrier and targets gliomas . Credit: NIMTE

A research group led by Prof. Wu Aiguo at the Ningbo Institute of Materials Technology and Engineering (NIMTE) of the Chinese

Academy of Sciences (CAS), in cooperation with Prof. Dan Larhammar's group at Uppsala University, has proposed a D-peptide ligand of neuropeptide Y receptor Y_1 , which can serve as nanocarriers to facilitate the traversal of the blood brain barrier (BBB) and thus targets gliomas efficiently. Results were published in *Nano Today*.

Cancer diagnosis and treatment of tumors has become an important scientific issue of common concern in multidisciplinary fields such as biology and [materials science](#). The BBB restricts the entry of drugs into the [brain tissue](#), hindering the effective diagnosis and treatment of brain tumors, such as gliomas.

Based on structure-guided design in the lab, researchers at NIMTE developed a D-peptide ligand of Y_1 receptor, $^D[\text{Asn}^{28}, \text{Pro}^{30}, \text{Trp}^{32}]\text{-NPY}(25\text{-}36)$ (^DAPT).

Experimental and computational validation results indicate that when interacting with Y_1 receptor, ^DAPT possesses higher affinity than the corresponding peptide with standard L-amino acids (^LAPT), since the quantity of hydrogen bonds for ^DAPT is 2.5 times higher than ^LAPT .

In addition, a transcytosis experiment was conducted by virtue of an in vitro BBB model, demonstrating that ^DAPT modified nanomicelles exhibit superior efficiency in crossing the BBB comparing with ^LAPT and can specifically targets gliomas.

According to in vivo studies, ^DAPT nanomicelles show great potential in improving photothermal therapeutic efficacy and photoacoustic tumor imaging efficiency when loaded with a near-infrared photosensitizer IRDye780.

This study sheds light on the mechanism exploration of the neuropeptide Y crossing BBB and facilitates the accurate diagnosis and treatment of

gliomas and other central nervous system diseases.

More information: Yanying Li et al, A D-peptide ligand of neuropeptide Y receptor Y1 serves as nanocarrier traversing of the blood brain barrier and targets glioma, *Nano Today* (2022). [DOI: 10.1016/j.nantod.2022.101465](https://doi.org/10.1016/j.nantod.2022.101465)

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