

# Discovery of Translocator Protein Targeting Cancer Therapeutics as effective substances

Seoul National University



ONCOLOGY	Hit
Product Type	Synthetic drug-Liposomal nano drug carrier
Indication	Therapy for translocator proteins (TSPO) overexpressed cancers
Target	Translocator proteins overexpressed cancer; Glioblastoma
MoA(Mechanism of Action)	<ol style="list-style-type: none"> <li>1) Delivery of mitochondria-specific photosensitizer into cancer</li> <li>2) Reactive oxygen species (ROS) generation under laser irradiation</li> </ol>
Competitiveness	<p>Mitochondria targeted photodynamic therapy</p> <ol style="list-style-type: none"> <li>1) Mitochondrial-targeted anticancer drugs cause a decrease in mitochondrial energy production, an increase in ROS, and an increase in mitochondrial outer membrane permeability, leading to fatal apoptosis in cancer cells.</li> <li>2) TSPO is expressed in mitochondria and is known to have correlation with poor prognosis, especially affecting metastatic proliferation of cancer.</li> <li>3) TSPO targeting photosensitizer (BS333) is synthesized by conjugation of photosensitizer (IR780) and TSPO binding ligand. It has potent photodynamic therapeutic activity and a high binding affinity for TSPO (<math>K_i &lt; 250</math> nM).</li> </ol> <p>Enhanced drug delivery using pH-sensitive nano carrier</p> <ol style="list-style-type: none"> <li>1) Normal organ uptake can be avoided by introducing pH-sensitive liposomal drug carrier although TSPO expressed in normal organs such as heart, kidney, and bladder.</li> <li>2) The pH-sensitive liposome (pH-lipo) enhanced tumor targeting ability due to acidic conditions in tumor microenvironment, thereby reducing side effect of therapies.</li> <li>3) Our TSPO targeting therapeutics loaded in pH-sensitive liposome (BS333 pH-lipo) has the highest cancer cell killing effect among previously reported TSPO targeting therapeutics (<math>IC_{50} = 0.46</math> <math>\mu</math>M).</li> <li>4) This platform can be utilized for TSPO targeted photodynamic therapy, chemotherapy, and radionuclide therapy.</li> </ol>
Development Stage	Hit
Route of Administration	Intravenous injection