Galactosyl serum albumin-rhodamine green

GSA-RhodG

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Chemical name:	Galactosyl serum albumin-rhodamine green	
Abbreviated name:	GSA-RhodG	
Synonym:		
Agent Category:	Polypeptide	
Target:	β-D-galactose receptor	
Target Category:	Receptor binding	
Method of detection:	Optical fluorescence imaging	
Source of signal:	Rhodamine green (RhodG)	
Activation:	No	
Studies:	• *In vitro* • Rodents	No structure is currently available in PubChem.

Background

[PubMed]

Optical fluorescence imaging is increasingly used to study biological functions of specific targets (1, 2). However, the intrinsic fluorescence of biomolecules poses a problem when fluorophores that absorb visible light (350–700 nm) are used. Near-infrared (NIR) fluorescence (700–1,000 nm) detection avoids the background fluorescence interference of natural biomolecules, providing a high contrast between target and background tissues. NIR fluorophores have wider dynamic range and minimal background as a result of reduced scattering compared with visible fluorescence detection. They also have high sensitivity, resulting from low infrared background, and high extinction coefficients, which provide high quantum yields. The NIR region is also compatible with solid-state

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optical components, such as diode lasers and silicon detectors. NIR fluorescence imaging is becoming a non-invasive alternative to radionuclide imaging in small animals.

On their cell surface, a variety of cancer cells express receptors (lectins) that bind to glycosylated proteins (3, 4). The β-D-galactose receptor binds and internalizes proteins that contain galactose sugar residues. Galactosyl serum albumin (GSA) was labeled with rhodamine green (RhodG) to study *in vivo* biodistribution of the tracer in tumor-bearing mice (5). RhodG is an optical fluorescence dye with an absorbance maximum at 502 nm and an emission maximum at 527 nm with a high extinction coefficient of 75,000 $M^{-1}cm^{-1}$. GSA-RhodG was found to have a high accumulation in a variety of human ovarian adenocarcinomas in nude mice (5).

Synthesis

[PubMed]

GSA, which contains 23 galactosamine residues, was incubated with RhodG-succinoimidyl ester for 15 min at room temperature (5). GSA-RhodG was isolated by column chromatography. There were ~3 RhodG molecules per GSA.

In Vitro Studies: Testing in Cells and Tissues

[PubMed]

Flow cytometry and fluorescent microscopy confirmed intracellular accumulation of GSA-RhodG to all nine human ovarian adenocarcinoma cell lines tested, with 89.5–99.8% of cells showing fluorescence (5). On the other hand, bovine serum albumin (BSA)-RhodG showed significantly lower intracellular accumulation with only 7.3–32.3% ($P < 0.0001$) of cells showing fluorescence. The mean fluorescence intensity for cells treated with GSA-RhodG (170.6) was >19-fold that of the cells treated with BSA-RhodG (8.6).

Animal Studies

Rodents

[PubMed]

Gunn et al. (5) performed biodistribution studies of GSA-RhodG in nude mice bearing intraperitoneal (i.p.) xenografts of human ovarian adenocarcinoma from the SHIN3, SKOV3, OVCAR5, or OVCAR8 cell lines. Images were obtained after i.p. injection of 25 μg (~0.3 nmol) of GSA-RhodG. Substantial fluorescence intensity was observed in all tumors formed from the four tumor cell lines in the exposed abdomen at 3 h after injection. Tumors <1 mm in diameter were visible. On the other hand, BSA-RhodG treatment revealed minimal tumor fluorescence. No blocking experiment was performed.

Other Non-Primate Mammals

[PubMed]

No publication is currently available.

Non-Human Primates

[PubMed]

No publication is currently available.

Human Studies

[PubMed]

No publication is currently available.

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Intramural Research Program

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