

Research at a Glance

The role of NG2 proteoglycan in glioma

What's known:

Neuron glia antigen-2 (NG2) is a protein expressed by many central nervous system cells during development and differentiation. NG2-expressing oligodendrocyte progenitor cells have been identified as the cells of origin in gliomas, tumors that arise from the brain's gluey supportive tissue. What's more, NG2 expression also has been associated with childhood diffuse intrinsic pontine glioma (DIPG) an aggressive tumor that accounts for 10 percent to 20 percent of pediatric central nervous system (CNS) tumors. Radiation can prolong survival by a few months, but children diagnosed with DIPG typically survive less than one year.

What's new:

Researchers are searching for appropriate targets and effective drugs that offer some chance of benefit. A team of Children's National Health System researchers investigated whether NG2—which plays a critical role in proliferation and development of new blood vessels and promotes tumor infiltration—could be a potential target for cancer treatment. Of the various options, antibody-mediated mechanisms of targeting NG2 are feasible, but the size of antibodies limits their ability to cross the blood-brain barrier. "Due to its role in maintaining a pluripotent pool of tumor cells, and its role in tumor migration and infiltration, NG2 provides multiple avenues for developing therapeutics," the research team concludes. "Moreover, the large extracellular domain of NG2 provides an excellent antigen repertoire for immunotherapeutic interventions. As such, further research is warranted to define the role and expression regulation of NG2 in CNS cancers."

Questions for future research:

- Q:** Because healthy oligodendrocyte progenitor cells are important for the child's developing brain, how could further characterization of NG2 isoforms help prevent drugs from damaging those beneficial cells?
- Q:** Could NG2-binding peptides cross the blood brain barrier to deliver anti-cancer therapies precisely to tumor sites?

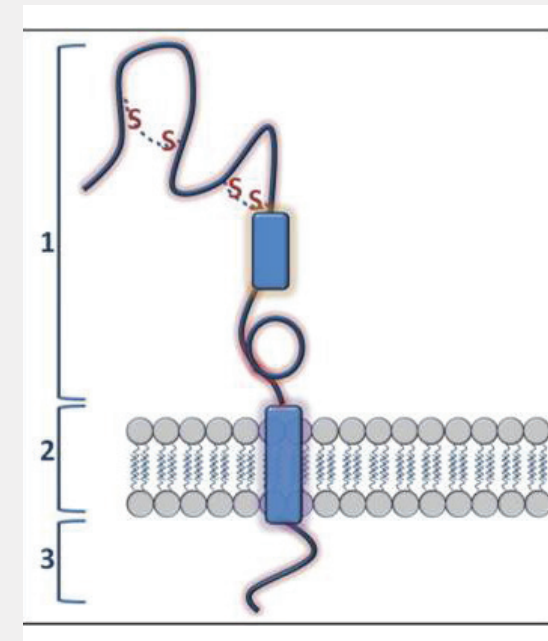


Figure: The NG2 protein consists of a large extracellular domain with 2,225 amino acids that accounts for 95 percent of the protein, a small transmembrane domain that consists of 25 amino acids, and a short cytoplasmic tail consisting of 76 amino acids.