

Study Questions

1. Analysis of syndecan-1 by anion-exchange, gel filtration and electrophoresis demonstrates great polydispersity. What are the features that result in this behavior?
2. What factors might determine the length of hyaluronan and sulfated glycosaminoglycans.
3. Overexpression of Ext2 (which is part of the heparan sulfate copolymerase complex) increases the extent of sulfation of the chain. Provide an explanation for this finding.
4. In biology, often rare structures have potent biological activities. Describe so-called rare structures in sulfated GAG chains. How do they come about?
5. You fractionate a preparation of heparan sulfate using a protein ligand that depends on heparan sulfate for activity and obtain chains that bind and chains that don't bind. Analysis of the disaccharide composition of the chains by heparin lyase digestion did not reveal any differences. How do you explain this result?
6. Hyaluronan, the least complex glycosaminoglycan, demonstrates very unusual biological properties. Short fragments can activate signal transduction, whereas high molecular weight fragments do not. How do you explain this finding?
7. How would you prove that an HA chain assembles from the reducing end versus the non-reducing end?
8. Recent work indicates that HA synthesis can initiate on a chitin oligosaccharide. Explain mechanistically how a "copolymerase" might produce a homopolymer of N-acetylglucosamine? How would you prove that this occurs in vivo?