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The use of the radius of gyration in a WLC polymer model of cancer cell adhesion to glycosaminoglycans substrates ANTONIO PERAMO, GARRETT MATTHEWS, University of South Florida — Glycosaminoglycans (GAG) are a group of polysaccharides involved in several biological functions, including cell adhesion. Most of their biological properties are derived from the interactions of the chains with their environment, hence the interest in developing physical models that could describe their interactions with whole cells. As linear biopolymers with low polydispersity, GAG can be described using polymer models of Gaussian chain distributions, like the WLC (worm-like chain) model. We found that the adhesion of whole cancer cells to glass substrates coated with GAG appear to be dependent on the charge per dimer and degree of sulfation of the GAG chain. We have hypothesized that the adhesion of whole cancer cells to GAG substrates can be described as a function of polysaccharide radius of gyration and used the WLC model describing the global structure of the GAGs to analyze this relationship. We will show that the adhesion of the cancer cells has a linear response with the radius of gyration and is essentially controlled by the charge per dimer. This dominating mechanism is not eliminated when the cells are resuspended in media with heparin. We then propose how these physical properties could be used to predict the preferred molecular structures of compounds for use as anti-metastatic or anti-inflammatory agents.

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