

3.034- practice homework part-B

1) The stress bearing, movable joints of the human body are made of dense connective tissue called cartilage. Cartilage is made of a proteoglycan aggregate comprised of aggrecan molecules. The aggrecan molecules contain a protein core with regions that are substituted with side chains made of the polymer chondroitin sulfate. It is currently of interest to study the mechanical properties of aggrecan molecules. This can be accomplished by covalently binding the aggrecan molecules to a gold surface and probing the mechanical properties with an AFM (atomic force microscope) tip.

Show the coupling chemistry that could be used to covalently bind aggrecan molecules to the gold surface. Please note that amine terminated aggrecan (aggrecan-NH₂) is available for such chemistry.