Module 10 Assignment

585.751.81 Immunoengineering

1. Which engineering strategy (either one discussed in lecture or found in your own research) do you think is optimal for designing “stealth” nanoparticles? There is no wrong answer, but your response should include a description of your chosen technique and the mechanism by which it promotes “stealth” and the advantages of the technique over other approaches. (30 points)

2. Design a biomaterial implant for an application of your choosing that is engineered to have reduced inflammation and foreign body reaction. Parameters, such as the following, should be considered: (40 points)
   - Physical parameters (e.g size, geometry, typography)
   - Surface chemistry (including any surface modifications or treatments)
   - Incorporation of any agents or cells

3. PEG is extensively used in designing nanoparticles and larger biomaterials to prevent immune cell recognition. How does PEG reduce immune recognition of and response to a nanoparticle or implanted biomaterial? What are the advantages and disadvantages of PEGylation? (30points)