**Assignment 7: Cell Adhesion and Migration**

**EN 585.729 Cell and Tissue Engineering**

**Problems**

1. Name that molecule or complex (adhesion/junction):
2. Thin alpha helix fibrils, found in intervertebral disks **microfibril**
3. Motors composed of this protein are used to contract the cell during migration **myosin**
4. Cell-cell adhesion that links to intermediate filaments **desmosome**
5. A dimer that contains a heparin-binding domain which facilitates binding to other ECM molecules as well as growth factors resulting in haptotactic gradients **fibronectin**
6. A monomer that participates in homotypic bonds during the leukocyte adhesion cascade **selectin**
7. Comes in many lengths and (with one exception) covalently attach to proteins increasing their sugar content **glycoprotein**
8. An adhesion that utilizes integrins and connects to the actin cytoskeleton **focal adhesion**
9. Three chains joined together in a cross or “t” shaped **laminin**
10. (1 page or less) Provide a critical response to the assigned reading article “Directed Migration in Neural Tissue Engineering” by Wrobel and Sundararaghavan. First, concisely summarize the goals of this review paper (why was it written?). Second, respond to the paper by thinking critically about what the authors have told you → In the response please consider the different methods of directed migration and comment on which methods are the most advanced, have been the most successful and are good candidates for combination with other directed migration methods.

Which methods are the most advanced?

Which methods have been the most successful?

Which methods are good candidates for combination of other directed migration methods?

The article starts describing the challenges faced by neural tissue engineering and the limitations of autograft tissue. Using directed cellular migration, the authors believe that future nerve growth conduits (NGCs) will eventually address these challenges and will replace autografting. The authors review in details the existing major studies to create a variety of gradients to initiate guided cell migration: chemotaxis (chemical cues), hapoptaxis (adhesive substrate), durotaxis (substrate mechanics, stiffness factor), topographical cues, electric filed stimulation, and contact guidance-mediated growth. In conclusion, the article mentions combination strategies as the most promising strategies for tissue engineering.