ABET Addendum (Braden Nucum

1. List two to four Desired Needs of your project that led to your final design objectives. Answer in two to four bullet points or concepts within a sentence or two.

- Prototype an osteochondral graft to address focal osteochontral defections
- Develop a repeatable collagen II extraction workflow that is easily modified
- Extract enough collagen to be used in hydrogel formation

2. List the major Constraints on your design/project

a) Safety/Regulatory Affairs

- Certain chemical and biological materials can be hazardous is not handled properly if lab safety protocols are not followed

b) Risks

- Bioreactor leaks, Certain exothermic biochemical assays, cross contamination

c) Global Impact

- Easily accessible and affordable joint repair solution.

d) Manufacturability

- Cheap production and easily reproducible extraction protocols

e) Quality Control/Marketability

- Graft mechanical integrity tests, biochemical assays to test extraction efficiency

3. List the major Engineering Standards on your design/project

a) affected the components used in the device, and/or

- ASTM F3987, ASTM F2900, ASTM F2027

b) standards that constrain the device and its performance, and/or

- ASTM F2212, ASTM F2211

c) standards that could be developed from your project

- ASTM standards for the extraction of collagen II from bovine articular cartilage and FDA standards for the preclinical testing of tissue derived medical devices

4. Explain Ethical, Environmental, or Societal concerns for practical applications of your project.

- We need to ensure that the tissue we are using is ethically sourced, whether human or animal tissue
- Proper waste disposal of hazardous materials
- Accessible and affordable way to improve patient mobility

5. Describe Active Teamwork and Leadership in your design group

- We split into several subprojects that worked between each other to ensure even work distribution
- Met weekly with advisor to share progress and plan out next steps
- Gave constructive feedback to other subprojects to ensure varied ideas

6. What were the most significant motivating factors that led you to

a) acquire new knowledge

- Lack of organized documentation for my subproject

b) be self-initiating

- Having to lead my own subproject, and the hard working and professional environment of the team and lab

c) persist against challenges and setbacks.

- A supportive group of groupmates and a fair and honest PI who gave directed feedback

7. What are your most innovative and/or entrepreneurial ideas for this project

- Developing a simple, reproducible collagen II extraction procedure can be modified easily to be used for other applications