

Senior Design Project Description for FALL 2016

Project Title: Analysis of Drug Loading and Release Kinetics (UNCC_DRUG)

Supporter: UNC Charlotte

Supporter Technical Representative: ASSIGNED

Faculty Mentor: ASSIGNED TBD (check one)

Single Team Dual Team (check one)

Personnel (EN/ET): E, Cp, Cv, 1 M, SE

(Complete if the number of students required is known)

Expected person-hours: (250 per student)

Description of Project:

The objective of this project is to analyze drug loading and release kinetics of calcium phosphate based bioceramic. Bioceramics particles will be immersed in antibiotic solution and the amount of drug adsorbed on the material surface will be measured. The Bioceramic-drug hybrid will be immersed in phosphate buffer solution and the concentration of the antibiotic released from the ceramic into the solution will be measured after various time periods. The drug release kinetics will be correlated to the amount of the drug loaded and the nature of bond between the ceramic and drug molecules. The concentration of the released drug will be determined by UV-Vis spectrometry and High Performance Liquid Chromatography (HPLC). The student will learn how to prepare bioceramic drug delivery system and evaluate its efficacy in vitro.

Side Objectives

Initial Project Requirements (e.g. weight, size, etc.):

Bioceramics particles will be immersed in antibiotic solution and the amount of drug adsorbed on the material surface will be measured. The Bioceramic-drug hybrid will be immersed in phosphate buffer solution and the concentration of the antibiotic released from the ceramic into the solution will be measured after various time periods. The drug release kinetics will be correlated to the amount of the drug loaded and the nature of bond between the ceramic and drug molecules. The concentration of the released drug will be determined by UV-Vis spectrometry and High Performance Liquid Chromatography (HPLC). The student will learn how to prepare bioceramic drug delivery system and evaluate its efficacy in vitro.

Side objectives will be:

1. Preparation of bioceramic-drug hybrid
2. Determination of drug binding to bioceramic
3. Preparation of standard solution for drug concentration measurements
4. Measurements of the drug concentration using UV-Vis and HPLC

Expected Deliverables/Results:

Deliverable for this project will be a detailed report summarizing the results.



UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING

List here any specific skills or knowledge needed or suggested (If none please state none):

Student concentration must be bio-engineering.