

CHEMISTRY 412/612

Metals in Medicine

Spring, 2010

Brief Syllabus

Mon/Wed/Fri. 11:40 – 12:35, Lecture (100 LSC)

Web Site: <http://blackboard.syr.edu>

Instructor: Professor James C. Dabrowiak

Contact: Office, 2-016D, CST; phone, (315) 443-4601; e-mail, jcdabrow@syr.edu

Text: *Metals in Medicine*, James C. Dabrowiak, Wiley-Blackwell, Chichester, UK, 2009.

Prerequisites for Undergraduate Students in the Course: General chemistry and sophomore level organic chemistry.

Description of Course: Metals in Medicine is designed for students with interests in biochemistry, bioinorganic chemistry, biophysics, medicinal chemistry, biology, pharmacology, and bioengineering. The first part of the course present basic bonding concepts that are applicable to metallo-drugs and their biological targets, interactions that exist between the agents and substances in the biological milieu, basic pharmacokinetic and pharmacodynamic properties including transport and uptake of drugs by the cells, and methods for measuring efficacy and toxicity of agents. The steps from drug discovery to market place are also briefly outlined and discussed. The early part of the course lays the groundwork, in order that students can clearly understand how agents work, whatever their subject background.

The remainder of the course focus on individual metallo-drugs and agents for treating and detecting disease, their synthesis, structure and general properties, known mechanism of action and important physical and chemical principles that apply. Topics covered include cisplatin; platinum anticancer drugs; ruthenium, titanium, and gallium for treating cancer; gold compounds for treating arthritis, cancer, and other diseases; vanadium, copper, and zinc in medicine; technetium and gadolinium complexes for diagnosing disease; and metal containing compounds in the exciting new field of nanomedicine.

Learning Outcome: Students taking this course will learn about the present and future roles of inorganic chemistry in modern medicine.

Examinations: Three exams, each weighted 22% of the final grade, will be given on the dates and time (11:45 to 12:40), indicated in the syllabus. The final exam, which is given on the date and time set by the University will be comprehensive. The final exam accounts for 34% of the grade in the course. During exams, cell phones must be hidden from view and they must not be auditable during the exam. *Under no circumstances is a cell phone to be used as a calculator during the exam.*

Since there are both undergraduate (CHE 412) and graduate students (CHE 612) in the course, the grading for each population will be separate. Students taking CHE 612 can expect questions on the exams that are more demanding than those taking CHE 412.

Examination Policies: The dates and times for the three hourly exams (11:45 to 12:40) and the final exam are as indicated in the syllabus. *Except for the final exam there is no possibility to make up an exam.* A student with a valid medical excuse or a valid student-athlete excuse, who has missed one hourly exam, and who has *promptly* provided documentation related to the excuse, can have the averages of the other two exams used as the score for the missing exam. A student with a second or third "miss" will receive a grade of zero for the additional missed hourly exam(s). If a student has a valid medical excuse or a valid student-athlete excuse for a missed final exam, a comprehensive make up final exam, 2 hours in length, may be taken for the missing grade. The documentation pertaining to the excuse must be presented promptly after the missed final exam and reasonable time must be allotted for preparing the make up final exam.

Academic Honesty: Complete academic honesty is expected of all students. Any incidence of academic dishonesty, as defined by the SU Academic Integrity Policy (see <http://academicintegrity.syr.edu>), will result in both course sanctions and formal notification of the College of Arts & Sciences.

Disability Accommodation: Students with any sort of disability who may need special accommodations should contact me immediately. In order to obtain authorized accommodations, students should be registered with the Office of Disability Services (ODS), 804 University Avenue, Room 309, 315-443-4498 and have an updated accommodation letter. Accommodations and related support services such as exam administration are not provided retroactively and must be requested in advance