

Chemistry 401 – Topics in Biochemistry

<http://academic.reed.edu/chemistry/courses/chem391/401.html>

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Office Hours Mon. 2-3:30 PM and Wednes. 3:30-5 PM.

Meetings: Tuesday 6:10-7:30 in ETC 205

This course is intended to act as an introduction to reading the biochemical literature, with a particular focus in this year on the role of metals in biological structure and function – bioinorganic chemistry. The principal activity in the class will be to discuss 1-2 papers per week on a selected topic. Following a stabilizing period in which I lead the sessions, responsibility for leading discussion will fall to student groups.

In addition, an 8-10 page review paper of some topic related to metals in biochemistry will be due the day before Thanksgiving, with a revised version to be completed on the last day of finals. Details to follow.

The schedule is tentatively as follows:

Date:	Topic:
8/28	Introduction to Bioinorganic Chemistry
9/4	Siderophores
9/11	Metals and protein aggregation
9/18	Interaction of lead with proteins
9/25	Potassium ion channel
10/2	<i>Mystery metal</i>
10/9	Cisplatin – interaction with DNA
	<i>Fall Break</i>
10/23	Metalloregulatory proteins
10/30	Metals, RNA and regulation
11/6	Ferrochelatase vs. Antibody
11/13	Restriction enzymes
11/20	Ribozymes and metals* (<i>Thanksgiving</i>)
11/27	Superoxide reductase
12/4	Metal chaperones**

*Note that the meeting of 11/20 is two days before Thanksgiving. **Thursday classes meet on Tues. 12/4, but I would like to hold open the option of meeting on this day and skipping Thanksgiving week.

In this course, evaluation will be based on attendance and participation, presentations and the final paper. Attendance is expected at all class meetings.

Reading Assignment for Tuesday 9/4.

Iron sequestration using siderophores

Martinez et al. (2003) Structure and membrane affinity of a suite of amphiphilic siderophores produced by a marine bacterium. *Proc. Nat. Acad. Sci. USA* **100**, 3754.

Küpper et al. (2006) Photoreactivity of Iron(III)-Aerobactin: Photoproduct structure and Iron (III) Coordination. *Inorg. Chem.* **45**, 6028.

1. Allow 2-3 hours per paper (note that students taking the qual often obsess over a paper for 2-3 days).
2. Skim the paper first: Read abstract to get idea of what is happening, first & last paragraph to get background & likely conclusions. Look at methods/results to get first impression of what's going on, last couple of paragraphs of discussion to get take home.
3. In reading with care:
 - a. What is hypothesis being addressed, questions posed?
 - b. What techniques employed – be able to address with some specificity.
 - c. Connect figures and tables with arguments made in results sections. Do claimed results jibe with evidence presented? Also, make sure that methods used to get figures/tables are understood (ideally, that is...).
 - d. Discussion – what is the take home lesson and do results substantiate claims? What holes remain in the argument, what would next step be?
4. Identify unanswered questions.
 - a. Attempt to use outside sources to define terms that may be unusual. Google images is a surprisingly good way to get small molecule structure.
 - b. Bring questions to conference. We will typically march through papers chronologically, essentially re-reading them, and tackle the questions that arise as they come up, in sequence, in the paper.