Syllabus

Department of Chemistry
FCH 797 – Graduate Studies
Molecular Metabolism

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Molecular Metabolism
FCH 797 Section 2
Fall 2010

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SYLLABUS

Room and Time: FCH797 "Molecular Metabolism" will meet from 7-8 PM on Tuesdays in room 122 Jahn.

General course outline: This class will be an overview of literature related to metabolic engineering.

Grading: Students will present journal articles related to molecular biology, metabolic engineering and microbial metabolism. Presentations must be 45 min long. We will have a 10 min discussion about the paper to end the class if necessary, but you may be interrupted during your talk. This means that you may have include data or information from references for the paper to give an adequate background or to describe particular methods in detail. Students not presenting will be required to come up with 1 key question regarding the work.

You should present these papers to the group as if they were your own research.

Requirements for all presentations:

1. **Introduction/Background**: Provide an adequate background for the whole group of students. Since we have students of varying backgrounds, please provide a detailed description as to what question the authors are trying to answer, the importance of the work relative to the field and general public. These will be more extensive in the first go around since we will be covering review articles. The latter information will be for more "traditional" papers.
2. **Materials and Methods**: Provide an adequate background to techniques used for the paper. Enough background about a particular method should be given so that the audience can understand what the method can do.
3. **Results**: Go over the key figures or tables relevant to the results. You should be able to explain what each result means and if you believe there are any shortcomings to the work.
4. **Conclusions/future directions**: What conclusions did the authors come to? Are they supported by the experiments? If not, what could have been improved?

Include references in your presentation for details beyond the scope of the original paper.

Schedule: A **tentative schedule** with papers is included with this syllabus. Students will be required to get the papers from the library or download.

TENTATIVE SCHEDULE;

8/31	Go over Syllabus
9/7	Alex Levine [1]
9/14	Lucia Salamanca-Cardona [2]
9/21	Yuan Sha [3]
9/28	Qin Wang [4]
10/5	Chengjun Zhu [5]
10/12	Alex Mueller [6]
10/19	Ryan Tappel [7]
10/26	Xian Wang [8]

11/2	Wenyang Pan [9]
11/9	Xingfei Zhao [10]
11/16	Ben Lundgren [11]
11/23	No class (Thanksgiving)
11/30	Alex Mueller [12]
12/7	Qin Wang [13]

[1] McIntosh, M., Stone, B.A. and Stanisich, V.A. (2005) Curdlan and other bacterial (1-->3)-beta-D-glucans. Appl Microbiol Biotechnol 68, 163-173.
[2] Ross, P., Mayer, R. and Benziman, M. (1991) Cellulose biosynthesis and function in bacteria. Microbiol Rev 55, 35-58.
[3] Kearns, D.B. (2010) A field guide to bacterial swarming motility. Nat Rev Microbiol 8, 634-644.
[4] Deane, J.E., Abrusci, P., Johnson, S. and Lea, S.M. Timing is everything: the regulation of type III secretion. Cell Mol Life Sci 67, 1065-1075.
[5] Cornelis, P. (2010) Iron uptake and metabolism in pseudomonads. Appl Microbiol Biotechnol 86, 1637-1645.
[6] Bayer, T.S., Widmaier, D.M., Temme, K., Mirsky, E.A., Santi, D.V. and Voigt, C.A. (2009) Synthesis of Methyl Halides from Biomass Using Engineered Microbes. Journal of the American Chemical Society 131, 6508-6515.
[7] Campbell, J.W., Morgan-Kiss, R.M. and Cronan, J.E., Jr. (2003) A new Escherichia coli metabolic competency: growth on fatty acids by a novel anaerobic beta-oxidation pathway. Mol Microbiol 47, 793-805.
[8] Lennen, R.M., Braden, D.J., West, R.M., Dumesic, J.A. and Pfleger, B.F. (2010) A Process for Microbial Hydrocarbon Synthesis: Overproduction of Fatty Acids in Escherichia coli and Catalytic Conversion to Alkanes. Biotechnology and Bioengineering 106, 193-202.
[9] Schirmer, A., Rude, M.A., Li, X., Popova, E. and del Cardayre, S.B. Microbial biosynthesis of alkanes. Science 329, 559-562.
[10] Xia, X.X., Qian, Z.G., Ki, C.S., Park, Y.H., Kaplan, D.L. and Lee, S.Y. Native-sized recombinant spider silk protein produced in metabolically engineered Escherichia coli results in a strong fiber. Proc Natl Acad Sci U S A.
[11] Potvin, E., Sanschagrin, F. and Levesque, R.C. (2008) Sigma factors in Pseudomonas aeruginosa. FEMS Microbiol Rev 32, 38-55.
[12] Doucleff, M., Pelton, J.G., Lee, P.S., Nixon, B.T. and Wemmer, D.E. (2007) Structural basis of DNA recognition by the alternative sigma-factor, sigma54. J Mol Biol 369, 1070-1078.
[13] Kolodkin-Gal, I., Romero, D., Cao, S., Clardy, J., Kolter, R. and Losick, R. D-amino acids trigger biofilm disassembly. Science 328, 627-629.