Syllabus for Molecular Medicine

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Office hours. I will be available after class and will make another time available depending on the class interests. My office is in the ALS building. Enter my lab (Room 1031 ALS and ask for my office, which is in the back).

- Course Name: **Molecular Medicine**
- Course Number: **BB332**
- Course Credits: 3 Credits

Class 2:00 pm - 3:20 pm Gleesen Hall 100
Tuesday and Thursday

Prerequisites: None

Course Content: Molecular Medicine covers a huge range of possibilities, and we can alter the topics depending upon interests. To start, I have picked a number of videos, movies and popular, highly readable books to cover a several concepts that provide a view of how modern medicine and biochemistry came into being.

Week 1

I will provide some background on what I plan to cover and why. We will start with an initial assessment that will help gauge your backgrounds and interests.

Many of you will not have a strong biological background, so you will need to do some reading and ask for help from your classmates.

Start reading "*The Demon Under the Microscope*" by Thomas Hager. (Tom is based in Eugene and also wrote a great biography on Pauling.) The book is available at the bookstore and I will put several copies in the library. I want you to understand the founding of the modern pharmaceutical industry and medicine.

I will also put several copies of the movies below on reserve in the library for you.

View "*The Inter Life of a Cell*".
http://www.xvivo.net/animation/the-inner-life-of-the-cell/
I want you to understand the different structures and processes being illustrated. To understand the type of the cell being shown, look at the animation at:
http://multimedia.mcb.harvard.edu on *Extravasation of Neutrophils*. It is important for understanding the first video and this cell is a key player discussed later.

For Week 2

For the second lecture, we will have Dr. Mike Albrich, an ER physician from Portland

speak.

Go to the Pauling Collection and read about Pauling and "*Sickle Cell Anemia*". Pauling arguably started Molecular Medicine and the best collection in the world on this is here on campus. We will look at sickle cell anemia, which is a well-worn story that you most likely will have read about. But we will look at the edges where the story is not so clean. To understand sickling, you will need to know about actin, which well illustrated in "The Interlife..". We will discuss just a bit why is the disease still a terrible burden and the evolutionary pressures that have made it so prevalent.

So next think about the following question:
What killed the most people in the 20th century?

Week 3. We will discuss inflammation, sepsis, infection and wound healing and the importance of antibiotics. I will introduce the subject of oxidative stress, which still has not made an impact on modern medicine, but might yet.

Week 4: Watch "*Lorenzo's Oil*". This is a well-made movie about adrenoleukodystrophy and closely follows the real story. I have a friend who started his research career working on this disease and he told me that one scene of the father falling asleep in the NIH library is so real that one of the journals was open to one of his research papers. It shows how medical researchers often think too naively about biochemistry and miss therapeutic opportunities.

Week 5, watch "*Extraordinary Measures*" which was filmed mostly in Portland in 2010. It is about Pompe's disease, which is a glycogen storage disease. The movie is a bit schlocky (sugary sweet) and panned on Rotten Tomatoes. But how often do you get to see a biochemist played by Harrison Ford.

- *Learning Outcomes*.

Students will be expected to understand how medicine as evolved from being driven by empirical observation by understanding the molecular basis for disease. It is expected that students will become familiar with the functions of DNA, RNA, proteins and lipids as well as other basic biological processes. Insights will be gained on how the application of molecular medicine has transformed our society and understand the hard decisions ahead as new therapies are developed for orphan diseases. We will discuss why the price of AIDS drugs jumped 5000% in August 2015 and why cancer drugs are $50,000 more expensive than in Europe.

Students will learn what the limitations are in developing new therapies and why many diseases remain untreatable. Concepts of risk will be explored with emphasis in understanding how to decipher the conflicting health reporting in the popular press. Finally, students will learn about the radical transition that is impending in medicine

because of our new analytical abilities from *-omics* technologies to sequence DNA, RNA and proteins, while profiling metabolism. We are entering the realm of personalized medicine with so many possibilities that you all can influence and will certainly be affected by in the near future.

Evaluation of Student Performance: Grades will be based upon weekly quizzes, participation in discussions in Canvas, a mid-term, and a class project due in November. I do not plan on giving a final.

For many things we will cover, there may be no right answer and we will be seeking to explore alternatives.

Statement Regarding Students with Disabilities: Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 541-737-4098. *Disability Access Services, (6-4-15)*

Read the Link to Statement of Expectations for Student Conduct, i.e., cheating policies.
And Please, Please Don't.