



Spring 2017 Course Syllabus

March 11: Skin Structure and Diseases

We look at our skin every day from the outside, but have you ever wondered what it looks like on the inside? Why is your skin soft, yet at the same time tough? Why does your skin look “full” when you are young, and then “saggy” with age? Ever wondered what skin diseases look like?

In this module, not only will you learn what normal skin and skin diseases like acne, psoriasis and eczema look like from the outside, but you will learn how they look on the inside, using a microscope and tissue sections of skin. You will get to stain sections of skin yourself with special dyes that allow you to see the structure of the skin under the microscope.

Led by John T. Seykora MD PhD, Associate Professor of Dermatology, University of Pennsylvania; Lindsay Kalan PhD, postdoctoral fellow, Department of Dermatology, University of Pennsylvania; Christine Monteleon PhD, postdoctoral fellow, Department of Dermatology, University of Pennsylvania; DJ Moran, graduate student, Department of Dermatology, University of Pennsylvania; Deepa Patel, medical student, University of Louisville

March 18: The Skin Microbiome and a Clinic Visit

Amazingly, our normal healthy skin is home to millions of microbes that far outnumber our own skin cells! These microbial organisms help to keep our skin healthy and ward off disease-causing bacteria and fungi. In week 2 you will:

- Learn about the different types of skin-associated microbes, their functions in skin health and disease, and the methods that scientists use to study them.

Led by Elizabeth Grice PhD, Assistant Professor of Dermatology, University of Pennsylvania

- Read one of the first scientific papers to reveal the diversity of the skin microbial population, and meet the author of this paper so that you can ask her questions about it.

Led by Elizabeth Grice PhD

- Grow microbes from your very own skin, test them for antimicrobial resistance, and use polymerase chain reaction (PCR) to amplify the microbial DNA for further analyses. Your microbes' DNA will be sent to the Penn Next Generation Sequencing Core facility so that it can be sequenced. You will get to analyze these sequences in Week 3, in order to identify the exact microbial species that are living on your skin.

Led by Lindsay Kalan PhD; Christine Monteleon PhD; Deepa Patel

- Tour the Penn Next Generation Sequencing Core facility to see the massive and powerful DNA sequencing machines.

Led by Elizabeth Grice PhD and Lindsay Kalan PhD

- Join a skin doctor (dermatologist) in the hospital to meet and examine adult patients with interesting skin changes such as rashes, blisters, bumps, wounds, color changes, swellings, and tumors. The dermatologist will explain how the skin changes relate to the patients' underlying disease. She will discuss how the patient is being treated and tell you about the types of skin tests and procedures that can be used to help the patient.

Led by Temitayo Ogunleye MD, Assistant Professor of Dermatology, University of Pennsylvania and Todd Ridky MD, Assistant Professor of Dermatology, University of Pennsylvania

March 25: Techniques for Analyzing the Skin and its Microbes

- You will perform experiments on DNA from your very own skin microbes. You will analyze your skin microbial DNA using a technique called agarose gel electrophoresis. You will also identify the bacterial strains living on your skin by using a computer method called BLAST searching to analyze their DNA sequences.

Led by Lindsay Kalan PhD; Christine Monteleon PhD; DJ Moran; Deepa Patel

- Did you know that you can get DNA from the skin cells you see under a microscope, and this DNA can be used to understand skin diseases? You will learn how to do this using a special technique called "Laser Capture Microdissection". Using this technique you will "cut out" cells from specialized slides using a laser and collect them for analysis.

Led by Stephen Prouty PhD, Director of Histology Core, Penn Skin Biology and Diseases Resource-based Centre and Department of Dermatology; DJ Moran

- Did you know that scientists can alter genes in mice in order to study their functions? You will see some of these mouse mutants, and learn how disruption of a specific gene can lead to altered structure, texture or color of the hair, as well as other skin phenotypes.

Led by Sarah E. Millar PhD, Professor of Dermatology, University of Pennsylvania; DJ Moran

April 1: Bioethics and Skin Disease Diagnosis

- We will discuss the ethics of real and hypothetical clinical cases involving skin diseases. Is it OK to enroll a patient in a clinical trial that would not ultimately benefit that patient but might help others? Would it be ethical to test a new drug for a serious skin condition on prisoners?

Led by Jamie Shuda, EdD; Director of Life Sciences Outreach, Institute of Regenerative Medicine, the Netter Center for Community Partnerships at the University of Pennsylvania; Deepa Patel

- Diagnose the Disease! In this session you will use what you have learned at PASH to diagnose common skin diseases from patient photos and microscopic images of the skin. This will give you a taste of what it's like to be a dermatologist.

Led by John T. Seykora MD PhD

- We will end PASH with a session on planning and preparing for the college application process. Learn how to get one step closer to your career in science or medicine by preparing a resume, writing a personal statement, and practicing for interviews.

Led by Heather Butts JD MPH MA, Founder, L.E.A.R.N. for Life Consulting; Adjunct Professor, Columbia University School of Public Health and St. John's University School of Law