

JULY 2021 MEDICAL NEWSLETTER



SPECIALTY SPOTLIGHT: PATHOLOGY

page 2

- 3 - Genes, Guts, & Glory: Welcome to Crohn's Disease
- 4 - What are the Side Effects of Blood Pressure Medications?
- 5 - Can the Development of Gut Microbes predict Autism?
- 6- Shadowing: A How-to-Guide on Getting Experiences

Disease Detectives: Pathologists in Pathology

Rebecca Ince

Pathology is a medical specialty that studies the causes and effects of disease or injury. **In a sense, they are the disease detectives.** If you're an investigative person, and critical thinker, this may be an excellent and fitting career path for you!

What do pathologists do?

Pathologists do a number of things such as:

- Examine the body and body tissues
- Perform lab tests
- Help health care providers diagnose patients
- Offer insight for treatment plans

There are many different branches in pathology, some of these include:

- **Clinical pathology**
- **Anatomic pathology**
- **Cytopathology**
- **Forensic pathology**
- **Molecular pathology**

It takes some time to become a pathologist! Here's a look at the timeline:

4 years of undergraduate school: During this time, a student completes pre-medical requirements while pursuing their Bachelor's Degree. Students take their Medical College Admission Test (MCAT) during or after.

4 years of medical school: Upon acceptance to medical school, students spend the next four years being educated and trained to become physicians.

Licensure and residency: After graduating medical school, new M.D's and D.O's obtain their license and begin a 3-5 year residency program.

Board certification: After residency, most pathologists will get their board certification from the American Board of Pathology (ABP). This certification is renewed every 10 years!

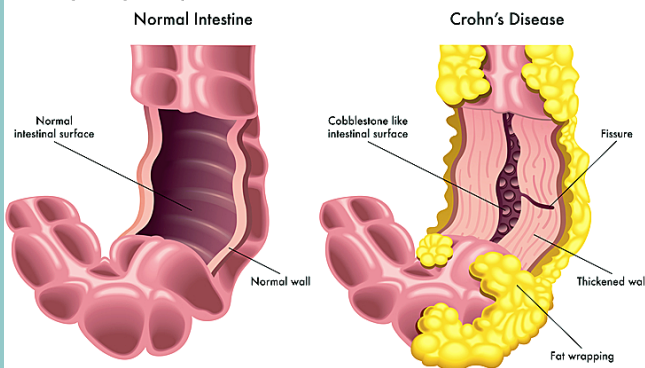
A career in pathology is an intriguing and rewarding one-- find out if it's right for you!



Genes, Guts, & Glory: Welcome to Crohn's Disease

Ryen Belle Harran

If you have a TV or have access to one, you've likely seen plentiful ads for medications devoted to irritable bowel diseases and arthritis. What if I quizzed you right now with the question: **What is Crohn's Disease?** (CD) Would you know what to say? The image below might give you some clues.

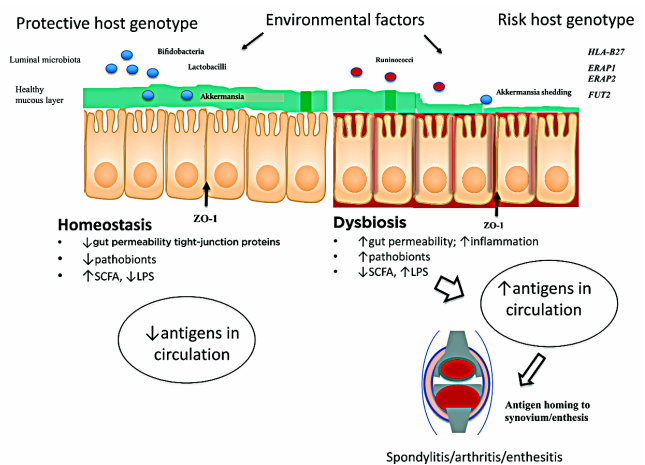


CD is a **chronic, autoimmune, heritable** disease that causes **inflammation** in the digestive tract. Age, ethnicity, family history, and a history of smoking are **risk factors**. Untreated, active CD may lead to **malnutrition, hematochezia** (blood in stool), **mouth ulcers**, abdominal **pain**, among others. At its worst, CD promotes the development of **fissures, fistulas, ulcers**, and colon **cancer**.

Over **3 million adults out of a total of 330 million Americans have been diagnosed with CD**, many more (most especially children) remain undiagnosed, and **these numbers are rising**.

The **European Medical Journal of Rheumatology**, in **its July 2021 edition**, featured an article on the connection of **spondyloarthropathies** (SpA), CD, and the **gut microbiome**. SpA (chronic inflammatory joint diseases) and CD were shown to be phenotypically and genetically co-inheritable.

Managing both conditions often proves to be difficult due to the **variety of factors** that **trigger** an at-risk person's autoimmune response.



One major factor of joint and gut inflammation involves the **presence of pathobionts** and specific combinations of gut microbiota (see figure above). Pathobionts are microorganisms that – under normal circumstances – are neutral, or even beneficial to their host, but **may become dangerous** to the host if the conditions are not ideal.

The research presented in the article highlights **great potential** for therapies. These include approaches to healing the gut's **mucin layer**, increasing the presence of health-promoting **short-chain fatty acids** in the colon, and targeting the thick lipopolysaccharide layers of **gram-negative bacteria**, which are used to disrupt intestinal tight junctions. Research involving exclusive **enteral nutrition, probiotics**, and **fecal transplants** are beginning to show promising results.

There is an **increased need** for new and more effective IBD **treatments**. While CD has become more common across the world, the **human population** is skyrocketing. Scientific breakthroughs may or may not include the proposed therapies, but **we will only know the truth if we try**. Science, now more than ever, needs rising innovators, like you, to enter the field of research.

What are the Side Effects of Blood Pressure Medications?

Srusti Chandra

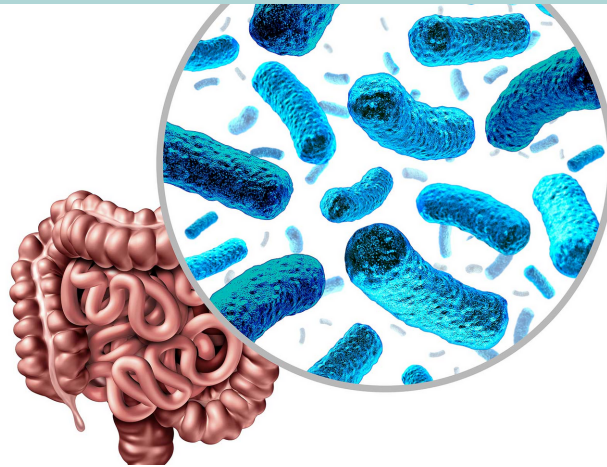


"We did not detect a difference in how the two types of medicine reduced the complications of hypertension, but we did see a difference in side effects...if a patient is starting hypertension therapy for the first time, our results point to starting with the ARB over the ACE inhibitor." George Hripcsak, M.D.

High blood pressure, also known as hypertension, is a common health condition and if left untreated, can lead to cardiovascular issues (e.g. heart disease, heart attack, stroke and more). Blood pressure reading is given in millimeter of mercury (mmHg) and it has two numbers: systolic pressure (the top number that is measured inside the arteries when the heart contracts) and diastolic pressure (the bottom number that is measured inside the arteries between contractions). A reading of 130/80 or above is considered hypertension. Most people do not experience symptoms when their blood pressure is high and thus, hypertension is considered a "silent killer."

There are two types of hypertension: primary and secondary. For primary hypertension, there is no identifiable cause and it develops over many years whereas secondary hypertension has an underlying condition (e.g. obstructive sleep apnea, kidney disease, thyroid problems and more). There are many risk factors for high blood pressure including age, tobacco use, family history, high sodium diet, stress, etc... It is important to take frequent blood pressure readings in order to determine if there is a problem.

If an individual has high blood pressure, lifestyle modifications (such as physical activity and diet) are recommended along with medications. Those beginning treatment can benefit from two different classes of medicine -- angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs), which work on the renin-angiotensin-aldosterone system that regulates blood pressure. A recent study published in *Hypertension*, an American Heart Association journal suggests that although these two classes of medicine are equally effective, ARBs are less likely to cause side effects. Researchers compared significant differences in medication side effects in roughly 3 million people; they found that although there were no significant differences in the occurrence of heart attack, stroke, or any cardiac event, those taking ACE inhibitors were more likely to develop the following conditions than those taking ARBs: angioedema (fluid buildup), dry and persistent cough, pancreatitis, and bleeding in the gastrointestinal tract. This study is crucial in determining the most appropriate medication for those experiencing hypertension as it is important for physicians to prescribe medications that cause the least complications/side effects (and these results point to starting with ARB over ACE inhibitors).



Can the Development of Gut Microbes predict Autism?

Sejal Kaushik

Autism, defined as a developmental disorder that interferes with communication and social skills, currently does not have a diagnostic test. A doctor references the behavioral and developmental history of a child in order to diagnose them- since there is no standard test, it can prove difficult for one to properly diagnose a child for autism. One study, based in China, has revealed a potential diagnostic test. The leaders of the study took stool samples from a mix of both autistic and typically

developed children. The stool samples revealed five microbe differences in the gut between autistic and non-autistic children. The leaders of the study established that these differences were influenced by three main factors: age, weight, and autism. They also ruled out the possibility of diet affecting the microbes. Along with this, microbe richness was noted to be higher in autistic children, and microbe functionality, specifically in those with neurotransmitter pathways, was decreased. With these new findings, it may become possible to introduce a non-invasive autism test.

SHADOWING

A How-to-Guide on Getting Experiences

Rebecca Ince

One of the necessary experiences that you will have as a pre-medical student is shadowing.

Shadowing can allow you to find out what your potential interests are and to help you see your commitment to medicine. Shadowing hours also show your commitment to medicine to the admissions committee when you apply to medical school. Here are a few ways you can get connected and gain some shadowing experiences!

1. Ask around: Ask your school's pre-medical community/advisor if they can set you up with a medical professional or ask family/friends if they know any medical professionals that you can shadow.
2. Cold-call/e-mail: Reach out to doctors' offices and hospitals and see if you can get connected.
3. Volunteer at a hospital: Reach out to a local hospital and see if there are any opportunities to volunteer
4. Work in the field: See what licensure and certification you can obtain if necessary and find a job in the medical field! Some examples include being a CNA, phlebotomist, or medical assistant!



CONNECT WITH US

