Dr. Cynthia Sears Explains the Connection Between Our Diet, The Gut Microbiome and Colorectal Cancer

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The Colon Cancer Foundation recently had the opportunity to speak with Dr. Cynthia Sears, Professor of Medicine and Oncology, Johns Hopkins University School of Medicine; Professor of Molecular Microbiology and Immunology at the Bloomberg School of Public Health. She is also the leader of the Bloomberg-Kimmel Institute for Cancer Immunotherapy at Johns Hopkins. Her current research focus is on the microbiome and how specific bacteria can contribute to colon cancer.

Dr. Sears, received her medical degree at Thomas Jefferson Medical College and completed her training in internal medicine at the Cornell Medical School, and trained in infectious diseases at The Memorial Sloan Kettering Cancer Institute and the University of Virginia. Over the past 20 years, Dr. Sears has conducted research on colonic microbiota and colon cancer, making her an expert in this field.

Q. What enticed you to start studying bacteria and the microbiome in relation to colon cancer.

Dr. Sears: I am an infectious disease doctor who got into internal medicine because of previous work I conducted. I conduct research on how the microbiome is impacted by organisms and bacteria. I am also looking at improving immunotherapy response among colon cancer patients, since, unfortunately, only 20% to 30% of colon cancer patients respond to immunotherapy—a majority of patients do not respond. I am currently working to help improve treatments for cancer patients.

Q. Can you help us improve our understanding of the interaction between a person's dietary habits and the gut microbiome and how it relates to colorectal cancer?

Dr. Sears: There's been substantial research showing that diet is a major driver of the composition and function of the microbiome. Individuals who shifted from a meat based diet to a vegetarian diet can see a shift in their microbiome in the first 24 to 48 hours. This shows that we have the ability to impact our microbiome based on the foods we eat. It also shows that we all

have the capacity to have a “good” microbiome. It is also important to note that each person is different in their response to a particular diet. For example, some individuals can eat ice cream and pizza and have no change in their physiology, while others may have a terrible response.

Q. Talking about the “ideal” diet, is there really an “ideal” diet? What impact does an individual’s genetics or environmental factors have on the gut microbiome?

Dr. Sears: We are not very good at targeting the individual level. As a society we can’t afford the type of testing it would require to figure out exactly what each individual should and should not be eating. We really must rely on public health and what’s best for most people. In relation to genetics, it’s published that less than 10% of the effect in our microbiome is related to our genetic makeup. There’s a lot of redundancy in the microbiome. We can have three perfectly healthy individuals and when we sequence their microbiomes, they would all look totally different. In one person a certain bug may be taking up a niche and promoting the production of short-chain fatty acids and in another individual, a totally different bug could be doing the exact same thing.

Q. There has been a lot of research comparing the Mediterranean diet with the Western Diet, with the Mediterranean diet being rich in grains, fiber, fruit, vegetables, and fish meanwhile the Western diet is high in fat and red meat. Do you have any advice for individuals on what diet they should follow?

Dr. Sears: People should try and follow a Mediterranean diet or the DASH [Dietary Approach to Stop Hypertension] diet. I’m a big fan of the idea that food is medicine.

Q. What would you like the public to know about the gut microbiome?

Dr. Sears: We are at least as many microbes as we are human cells but the microbes are just much smaller so the human cells are more evident. Microbes are critical to our overall health. Individual’s should strive to foster a good microbiome whether it’s on your skin, your mouth, or in your colon. There is also literature about the impact that exercise and physical activity can have on your gut microbiome as well as brain health and vascular health. The more an individual is focused on healthy living, the better they will be overall.

Q. What do you think is the future of this field?

Dr. Sears: The future direction in this field is immunotherapy, where we can use the microbiome as a biomarker. When you do a stool test or a plasma test the doctors will be able to tell you if you are more or less likely to respond to this therapy based on a microbial signal. This can relate to colorectal cancer because early-age onset colorectal cancer [EAO-CRC] is becoming frighteningly common but it is still rare enough that we are not doing colonoscopies on everyone under the age of 50. We can hopefully do something to see if a person is at a higher risk and then we can focus our care and try to prevent EAO-CRC.

Here are some additional resources on diet and lifestyle and how they can influence your colon health and overall wellness:

1. Healthy Inside and Out: How Diet and Lifestyle Impact Colorectal Cancer

2. Dietary Mindfulness Can Reduce the Risk of Colorectal Cancer
3. Could the Western Diet Be a Risk Factor for EAO-CRC?
4. Have You Had Your Fiber Yet? Food Habits and the Risk of Colorectal Cancer

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