**The Restaurant Inside Your Colon**

 Imagine that you want to go out to a restaurant to eat after a long day. When choosing a restaurant, you consider what kind of food it serves as well as how crowded it is. You select a restaurant you like, check if it can accommodate you and finally eat your meal. If you enjoyed it, you will make sure to come back in the future. This is a very ordinary scenario that we have unknowingly shared with our gut bacteria up until recently.

 Dr. Tyrrell Conway, regents professor and head of the microbiology and molecular genetics department at Oklahoma State University, along with Dr. Paul Cohen of the University of Rhode Island, have been researching exactly how *E. coli* live in the mucus of the gut. To study this, they analyzed the mucus found in the cecum of a mouse. “Until recently, there was little information on the residents of the colon, aside from *E. coli*, whichwe have been studying its niche for 20 years. Recently, we uncovered a commensal relationship that sustains resident *E. coli* in the gut”, said Dr. Conway.

 *E. coli* tends to consume whatever oxygen is finds. In doing this, the E. coil creates a better environment for anerobic bacteria. These anerobic bacteria produce sugars, which feed the *E. coli* in the gut. “Each strain of *E. coli* feeds on different sugars produced by the anerobic commensals”, Dr. Conway said. “Each strain has their own favorite restaurant. So, non-resident strains must compete with resident strains for entry into their own restaurant”. If the non-resident strain fails to become established within these restaurants, where different sugars are available for consumption, they will be expelled. This first concept is called the “restaurant hypothesis”, while the latter subject is “colonization resistance”. The next step in research is to figure out how many niches there are, how much *E. coli* could be sustained by each niche and what each restaurant serves.

 Why should we care about restaurants that are too small for us to visit? This new information on how we feed our gut flora, and by extension, ourselves, has the potential to improve digestive health. One such way to go about this is to tailor what we consume so we can better support our gut microbiome. “By being mindful of what we consume, we can play a direct role in by shaping the intestinal microbiome”, said Dr. Conway. Having a healthy microbiome can help gut residents out-compete invaders via colonization resistance, making it more difficult for them to establish themselves. Going beyond diet, this discovery can be used to improve probiotics. “Current probiotics don’t really do anything, and it’s because the ingested bacteria either don’t have a niche they can occupy in the gut, or they unsuccessfully compete with the resident bacteria”, Dr. Conway said. “With this information, we can create probiotics that have the correct bacteria. This would greatly improve the public’s gastrointestinal health”. This would be accomplished by replenishing the gut with bacteria that it is lacking in. It would simply require taking a capsule, where the deficient bacteria is delivered and becomes a resident. Functional probiotics and specialized diets for gastrointestinal health may be on the horizon.

**Citations**

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3. Oklahoma State University. (2018). Tyrrell Conway. Retrieved April 18, 2019, from <http://microbiology.okstate.edu/14-news/125-dr-conway/>