

It Is Time to Know Your Gut Microbe: Bifidobacteria

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Feeling lonely? Maybe you are not aware of it but you are always accompanied. Yes, it's true you are not alone in the absence of someone because we are accompanying you all the time since the day you are born.

Confused? Ok please don't be, we are always with you, and we are microorganisms.

Of course, you may have heard a lot about us; it is always being advertised (use hand wash, toothpaste, sanitizer to get rid of bacteria, germs, etc. etc.). Do you believe if I say that more than 5 kg of your body weight is because of microbes residing in your gut? And it includes both helpful and harmful organisms. That's the reason you are not alone, and microbes are part of you.

Oh! Wait a second! Let me introduce myself. I am *Bifidobacterium adolescentis* and I belong to the type of bacterial family called Bifidobacterium. All my family members carry the first name as bifidobacterium. It's just like your surname. Our ancient history was spotted long back in 1899 by physician Tissier in breastfed babies stool. According to him it precisely looked like alphabet 'Y'. So based on its shape he named it as bifidobacteria. The area of research on beneficial organisms in the gut was reported by then and was known as probiotics. According to World Health Organization (WHO) probiotics are the live microorganisms which will be helpful if consumed in adequate quantities. We the bifidobacteria are now considered important probiotics but then in the beginning we were mistaken to be one among the Lactobacillus family. Luckily, later in 1924 OrlaJanson recognised us and separated our family as bifidobacterium.

* Ms. Dhanashree, Ph.D. Scholar from CSIR - Central Food Technological Research Institute, Mysuru, is pursuing her research on "Understanding the Pleomorphic Nature of Bifidobacteria." Her popular science story entitled "It is Time to know your Gut Microbe: Bifidobacteria" has been selected for AWSAR Award.

We are the warriors raised to protect you from destroyers or invaders like harmful bacteria, and we will be taking care of your system by contributing to the resistance. That means my family members are the ones who enter your body first through your mother's breast milk and assure your safety. Once people understood our importance, they were after us for two decades to know more. Foremost curiosity was about our morphology, and it's been concluded that some particular components in the media, or the food scientists feed us with, plays an important role in keeping us in this unique bifid shape.

During those days researchers focus was on understanding morphology of the 2-3 members who were then known. Although one of my family members was identified and designated as bifidobacteria based on its shape, the era of research is advanced, and scientists are after us to find more about us. Now they are aware that more than 69 different members are in my family and analysing and understanding us will be more ideal. Out of curiosity and with interest recently in 2013, a team in CFTRI started research on our shape. Not all of us look alike, and definitely not all of us have the bifid shape that Tisser found. Obviously, there were questions to be answered like why we are all not in bifid shape? What is determining our shape? Is the name bifid a misnomer? Earlier why did they decide that media composition contributed to the morphology?

Well, the questions seem to bog down many scientists. To find out the answer the CFTRI team selected a few of my family members and took their SEM portfolio. As you aware, SEM is the closet view of any surface possible and is taken with an electron microscope. Understanding whether media composition plays an essential role with selected members was necessary. Irrespective of the media composition or external condition most of us still remained rod-shaped and only me (*B. adolescentis*) was in Y shape.

For your understanding I can simplify it. The structure of bacteria varies at different conditions just like human emotions vary based on the situation. So it is confirmed that you are not being named based on your character. Here also the team found that it's an intrinsic property of the bacteria to be in particular shape irrespective of the condition, and most of the bacteria are in rod-shape and only few will be in bifid shape. Accordingly, I'm the only one among the family of eight that has Y shape irrespective of the condition. Also, the name bifidobacteria for others is a misnomer. Hey! I'm happy because I'm Bifid, as my family name goes.

But that is not all; the team also found out accidentally how tough I am with drugs. For the first time, they found out that I can survive even in the highest concentration of drugs. This changes their impression of me a lot because, till now it was thought that probiotics are susceptible for to drugs. I mean if you have ever noticed that your physician prescribes probiotic tablet along with antibiotic it is to replenish gut flora in your system. Usually, the gut microbes will be sensitive to the antibiotics, and will be killed or washed out by the system. As you are aware, TB disease is the most dangerous, and for treating it highly effective drugs like Rifampicin, Isoniazid and Streptomycin sulphate are needed. Since it's proven that I could resist even these drugs despite the dosage, there is less to worry about. I am very sure I'll be the VVIP soon in the market as I can be useful for developing the probiotic antibiotic therapy. And I can resist not one but many drugs I'm a multidrug resistant.

Oh! It's time to end, and I don't think that I have shared all my secrets. There are many more. Be in touch to know more.

Your brain can be fooled, and your heart is an idiot, but your gut doesn't know how to lie. So dear, "Know your gut, and always trust your gut feeling." It will never misguide you.

Reference:

- Dhanashree**, Rajashekarn,S.,Krishnaswamy, B., & Kammar, R. (2017). Bifid shape Is Intrinsic to *Bifidobacteriumadolescentis*. *Frontiers in Microbiology*,8,478.
- Dhanashreee Lokesh**, Raman Parkesh, Rajagopal Kammara. (2018). *Bifidobacterium adolescentis* is intrinsically resistant to antitubercular drugs. *Scientific reports*,8(1),11897.