# Are probiotics a good partner for antibiotics?

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## Introduction

*This is the last of the three online programs exploring the remarkable ecosystem of gut microbiota. In this series, entitled "The power of gut microbiota", we are learning how the delicate balance of microbes in our digestive system can be disrupted by antibiotics and how probiotics can support the ecosystem back to equilibrium.*

*In the first program, we explored how microbiota works, its benefits for health, and then considered the impact of antibiotics on the gut microbiota. In the second episode, we looked at the importance of protecting the developing microbiota in the first few years of life, assessing the short- and long-term consequences of antibiotic use in these crucial early years.*

*This third episode is entitled "Are probiotics a good partner for antibiotics?". Here, we explore how probiotics contribute to the maintenance of a well-balanced microbiota during an antibiotic treatment, and how these effects are strain and dose specific.*

A great amount of information is provided to the public about gut microbiota as well as the value of taking pre- and probiotics. Numerous forms of probiotics are available in pharmacies or online but not all the probiotics are the same. To deliver optimal benefits, especially when it comes to restoring health when taking antibiotics, healthcare professionals and the lay public need to know those differences.

The scientific journalist Sue Saville interviews Prof. Guarner and Prof. Berni Canani. They first tell us how antibiotic overuse can disrupt the gut microbiota, with consequences that can appear in the long-term run. Then, they explain that some probiotics, such as *Saccharomyces boulardii* CNCM I-745, may have beneficial effects on the gut microbiota when taken during antibiotic treatments. They follow by showing us how and why not all probiotics are equal and conclude on the well-known mode of action of *Saccharomyces boulardii* CNCM I-745 and how, when taken with antibiotics, it may protect the gut microbiota and helps to prevent antibiotic-associated dysbiosis.

## Aim of the webinar

**To answer to the question « Are probiotics a good partner for antibiotics? » Prof. Francisco Guarner and Prof. Roberto Berni Canani discuss on:**

- The consequences of antibiotic treatment on the composition and function of gut microbiota.
- The treatment of acute diarrhea, and the prevention and treatment of antibiotic associated diarrhea.
- The beneficial effects of probiotics on the intestinal flora.
- The differences that exist between probiotics.
- The fact that *Saccharomyces boulardii* CNCM I-745, thanks to its specific properties, may protect microbiota when taken with antibiotics.

## Key lessons

***- Antibiotic treatments disrupt gut microbiota's composition and functions.***
***- One of the consequences of antibiotic treatments is antibiotic associated diarrhea.***
***- Probiotics can have a positive impact on the microbiota.***
***- Not all probiotics are equally effective. The manufacturing process and a specific formulation make them unique.***
***- Few studies have proven the efficacy of S. boulardii CNCM I-745, taken during antibiotic treatment, to protect or restore the intestinal microbiota.***

## Antibiotic treatments induce microbiota disruption

Within the gut, there is an ecosystem composed of trillions of bacteria belonging to several hundred species. They have important functions for health, especially for the immune and metabolic systems. If the ecosystem is disrupted, for example by antibiotics, these functions are no longer fulfilled. When a patient takes antibiotics, some of the gut bacteria that are susceptible to this antibiotic are killed. Immediately, the empty niches are occupied by antibiotic-resistant bacteria. This results in an imbalance in richness and diversity of species in the ecosystem called dysbiosis.

The use of antibiotics is a risk factor for allergies, inflammatory bowel disease, obesity, or fatty liver, and observational studies have shown a relationship between a higher risk of these diseases and the use of antibiotics. Therefore, these short-term antibiotic effects on gut microbiota and possible long-term consequences should be taken into account when prescribing an antibiotic therapy.

## Not all probiotics have the same effects

Probiotics are « living microorganisms which when administered in adequate amounts confer a health benefit on the host ». Studies have shown that some probiotics could have a positive impact on the action and function of the gut microbiota, on the immune system, metabolism, brain, etc. They can help restore and maintain intestinal flora when antibiotic treatment is needed, protect against pathogenic microorganisms, boost immune system, or even prevent some diseases.

There are many different types of probiotics, of various natures, bacteria, or yeast, and in different forms, as complemented foods, supplements, or probiotics drugs. Not all probiotics are equal in terms of health benefits. The manufacturing process and a specific formulation make them unique. Among all probiotics, some have been specifically studied. It is important to choose probiotics that have been evaluated in clinical trials and have strong evidence of efficacy in a specific clinical indication.

## *S. boulardii* CNCM I-745 protects gut microbiota during antibiotic treatment

A short video shows the discovery of *Saccharomyces boulardii* by Henry Boulard, in 1923, in the jungle of Indochina. He observed that, to fight the infectious diarrhea caused by cholera, the local population consumed a drink made from lychees and mangosteens. Henri Boulard decided then to study in detail its composition. He identified a specific yeast from the Saccharomyces family. In 1953, the pharmaceutical firm Biocodex acquired the rights to Henri Boulard's yeast strain and fermentation process. This unique strain was officially registered at the "Institut Pasteur" in 1989, under the name of *Saccharomyces boulardii* CNCM I-745.

*S. boulardii* CNCM I-745 has been studied and many clinical trials have tested its efficacy and safety[1]. It fosters the production of short chain fatty acids which are important for the intestinal epithelium and favor the barrier functions of the intestine and the gut immunity[2,3]. Based on the results of studies, the World Gastroenterology Organization (WGO) guideline for the use of probiotics in gastroenterology shows a high-level evidence for *S. boulardii* CNCM I-745 efficacy for the prevention of antibiotic associated diarrhea and the overgrowth of the pathogenic bacteria *C. difficile* during antibiotic treatment[4]. *S. boulardii* CNCM I-745 protects and restores the microbiota when using antibiotics[5].

# Conclusion

Antibiotic treatments may disrupt gut microbiota's composition and functions, and probiotics can help prevent these adverse effects. However, not all probiotics have the same efficacy, and it is important to choose a probiotic that has been proven effective in clinical trials. Studies have shown the efficacy of *S. boulardii* CNCM I-745 in protecting and restoring the intestinal microbiota when taken during antibiotic treatment.

## References to learn more about the topic of the webinar


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