The Role of Prebiotics and Probiotics in Gastrointestinal Disease

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KEYWORDS

• Probiotics • Prebiotics • Dietary fiber • Symbiotics • FMT

KEY POINTS

- Prebiotics and probiotics are important to the gastrointestinal tract.
- Many dietary fiber substances are prebiotics.
- Probiotics are live organisms that when administered in adequate amounts confer health benefits to the host and improve the intestinal microbial balance.

INTRODUCTION

With the advent of the scientific realization that the microbiota of the gastrointestinal tract was more than the cells that exist in the body, the full importance of prebiotics and probiotics has come forth.[1] This importance has been stressed and is available in new textbook entitled, "The Microbiota in Gastrointestinal Pathophysiology: Implication for Human Health, Prebiotics, Probiotics and Dysbiosis."[2] There is enough evidence now published in the literature so that the scientific world now believes that prebiotics and probiotics are important in gastrointestinal disease.[1,2] At Yale University, 4 workshops were held and were attended by prominent scientists in the field to make recommendations on the use of probiotics in health.[3–6] Since the last workshop, much literature has appeared on probiotics and prebiotic experience in gastrointestinal disease around the world. This article reviews the gastrointestinal diseases and attempts to add the recent literature to this information.

In **Table 1**, the latest recommendations published from the Yale workshop from 2015 in human diseases are listed.[6]

Probiotics

Definitions of probiotics and prebiotics are important. There is much debate about them, but it is best to keep in mind the original definitions. Probiotics are defined by

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Table 1
Recommendations for probiotic use: update 2015

Clinical Condition	Effectiveness	Specific Strain of Organism & Strain References	Analysis References
Diarrhea			
Infectious childhood—treatment	A	LGG, *S boulardii*, *L reuteri* SD2112	27–30
Prevention of infection	B	*S boulardii*, LGG	27,28,30
Prevention of AAD	A	*S boulardii*, LGG, combination of *Lactobacillus casei* DN114 G01, *L bulgaricus*, snf *S thermophilus*	31–33
Prevention of recurrent CDAD	B/C	*S boulardii*, LGG, FMT	34–37
Prevention of CDAD	B/C	LGG, *S boulardii*	34,37
IBD			
Pouchitis			
Preventing and maintaining remission	A	VSL#3	38–40
Induce remission	C	VSL#3	41
Ulcerative colitis			
Inducing remission	B	*E coli* Nissle, VSL#3	42–44
Maintenance	A	*E coli* Nissle, VSL#3	43–45
Crohn	C	*E coli* Nissle, *S boulardii*, LGG	46–48
IBS			
	B	*B infantis* 35624, VSL#3	49–53,a
	C	*B animalis*	54
		L plantarum 299V	55
Necrotizing enterocolitis			
	B	*Lactobacillus acidophilus* NCDO1748, *B bifidium* NCDO1453	56,57
Immune response			
	A	*L rhamnosus* GG, *L acidophilus* LAFT1, *L plantarum*, *Bifidobacterium lactis*, *Lactobacillus johnsonii*	58,59
Allergy			
Atopic eczema associated with cow's milk allergy			
Treatment	A	L G, *B lactis*	59
Prevention	A	LGG, *B lactis*	59
Radiation enteritis			
	C	VSL#3, *L acidophilus*	60,61
Vaginosis and vaginitis			
	C	*L acidophilus*, *L rhamnosus* GR-1, *L reuteri* RC14	62–64

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