Lactobacillus Sporogenes

Description

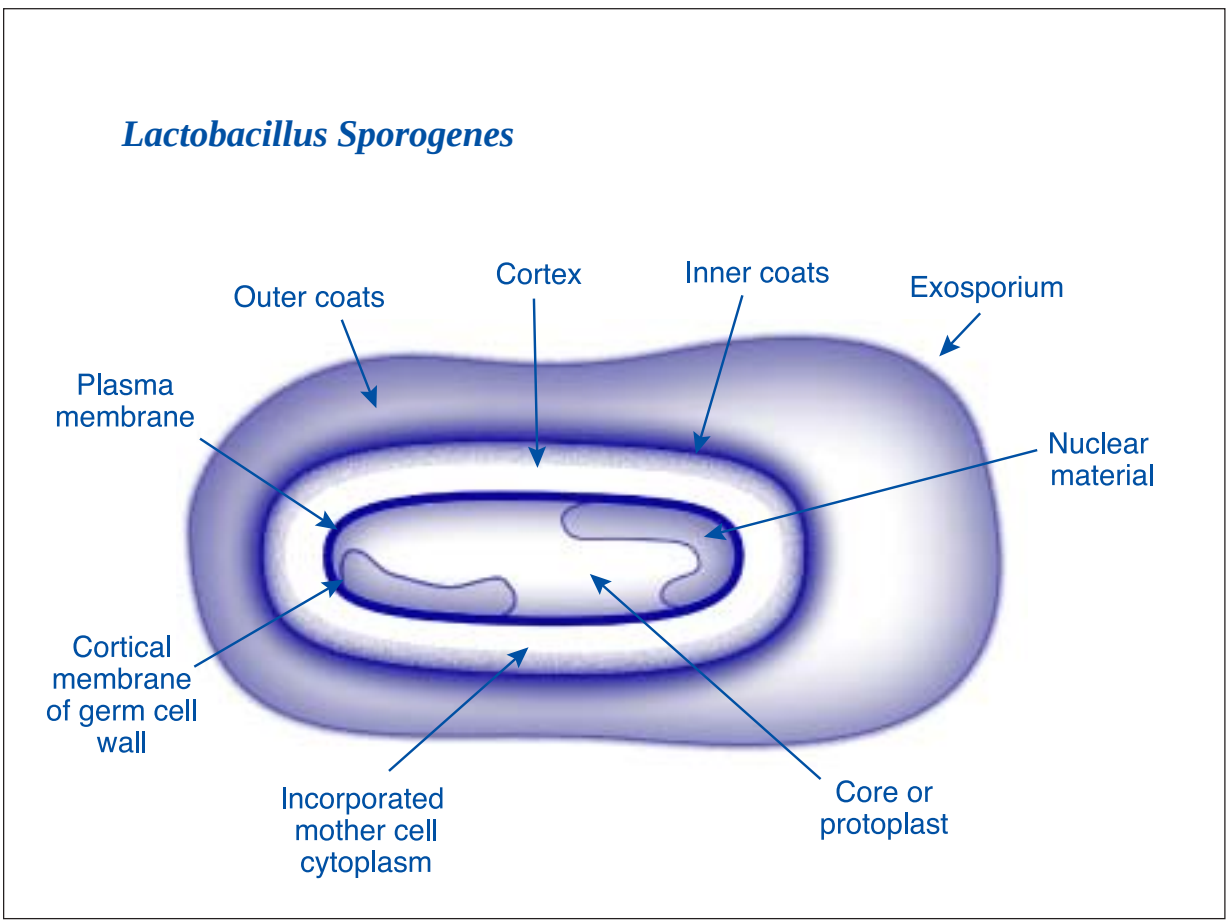
Lactobacillus sporogenes is a gram-positive, spore-forming, lactic-acid producing bacillus. It was originally isolated and described in 1933. The organism requires a complex mixture of organic substrates for growth, including fermentable carbohydrates and peptides.

Pharmacokinetics

Subsequent to oral administration, *L. sporogenes* passes through the stomach in its spore form and upon arrival in the duodenum, germinates and multiplies rapidly.[1]

Estimates suggest the average duration of time between oral dosing and germination is four hours.[1] After germination, *L. sporogenes* is metabolically active in the intestines, producing lactic acid.

L sporogenes is considered a semi-resident, indicating it takes up only a temporary residence in the human intestines. Spores of *L. sporogenes* are excreted slowly via the feces for approximately seven days after discontinuation of administration.[1]



Mechanisms of Action

Despite the transient nature of this organism in the digestive tract, the changes this lactic acid bacillus produces shift the environment in support of a complex gastrointestinal flora.[1,2]

The mechanism of action is presumed to be a result of improving gastrointestinal ecology by replenishing the quantity of desirable obligate microorganisms and antagonizing pathogenic microbes.[2,3]

Two isomeric forms of lactic acid can be produced by lactic acid-producing bacteria – dextrorotatory (D (-)) lactic acid and levorotatory (L(+)) lactic acid. L(+) lactic acid is completely metabolized in the body; however, D(-) lactic acid is not completely metabolized, resulting in a degree of metabolic acidosis. *L. sporogenes* produces only L(+) lactic acid.[1]

L. sporogenes is assumed to produce bacteriocins[2] and short chain fatty acids. As the organism grows, it assimilates and incorporates cholesterol into its cellular structure.[1]

L. sporogenes possesses significant β-galactosidase (lactase) activity *in vitro*.[4]

Clinical Indications

Lipid Disorders

Administration of *L sporogenes* to rabbits resulted in a 90-percent inhibition in the rise of serum cholesterol secondary to feeding of high cholesterol diets.[5]

Oral *L. sporogenes* supplementation (360 million spores/day) decreased total serum cholesterol from an average of 330 mg/dL to 226 mg/dL in 17 subjects with type II hyperlipidemia over a three-month time interval. HDL-cholesterol increased slightly. No changes in serum triglyceride levels were observed.[6]

Digestive Disorders

In laboratory animals with bacterial dysbiosis, *L. sporogenes* supplementation inhibits growth of pathogenic microorganisms and results in renewal of desirable obligate gastrointestinal organisms to normal levels.[3] Reports suggest that supplementation produces a rapid resolution of acute gastrointestinal infection induced by pathogenic bacteria in calves.[3]

It has been reported that the efficacy of treatment in patients with bacterial dysbiosis receiving *L sporogenes* was 20-30 percent higher than traditional probiotics such as *Lactobacillus acidophilus* of Bifidobacteria.[2]

Seventy percent of individuals suffering from chronic constipation treated with 300-750 million spores per day of *L. sporogenes* for two to 10 days experienced an amelioration of abdominal distention and a normalization of stools.[7]

Reports suggest a benefit in neonatal diarrhea.[7]

Aphthous Stomatitis

Reports suggest efficacy in the treatment of aphthous stomatitis with resolution occurring within two to three days.[8,9]

Vaginitis

Vaginal administration of *L. sporogenes* was investigated in non-specific vaginitis. Subjects with Trichomonas or Candida vaginitis were excluded from the study. Complete relief of pruritis and discharge was reported by 93 percent of subjects. Postmenopausal subjects had a slower response to therapy.[10]

Toxicity and Side Effects

Acute toxicity studies in animals have been conducted with doses as high as 50 g/kg for seven days. No abnormalities, either during supplementation or in the period after withdrawal of the supplement, were observed. Chronic supplementation of doses as high as 5 g/kg for 15 months in animals results in no observed toxicity. In humans, adverse reactions following supplementation have not been reported.

Dosage

A reasonable dose is 100 mg two to three times daily. Each 100 mg contains approximately 1.5 billion colony-forming units.

References

1. Majeed M, Prakash L. *Lactospore®: The Effective Probiotic*. Piscataway, NJ: NutriScience Publishers, Inc.; 1998.
2. Voichishina LG, Chaplinskii VI, V'iunitskaia VA. The use of sporulating bacteria in treating patients with dysbacteriosis. *Vrach Delo* 1991;12:73-75. [Article in Russian]
3. Smirnov VV, Reznik SR, V'iunitskaia VA, et al. The effect of the complex probiotic sporolact on the intestinal microbiocenosis of warm-blooded animals. *Mikrobiol Z* 1995;57:42-49. [Article in Russian]
4. Kim YM, et al. Studies on the production of β-galactosidase by *Lactobacillus sporogenes*. Properties and applications of β-galactosidase. *Korean J Applied Microbiol Bioeng* 1985;13;355-360.
5. Kumar ORM, Christopher KJ. Feeding of *L. sporogenes* to rabbits. *Ind Vet J* 1989;66:896-898.
6. Mohan JC, Arora R, Khalilullah M. Preliminary observations on effect of *Lactobacillus sporogenes* on serum lipid levels in hypercholesterolemic patients. *Indian J Med Res* 1990;92:431-432.
7. Dhongade RK, Anjaneyulu R. *Maharashtra Medical J* 1977;23:473-474. [abstract]
8. Mathur SN, et al. Sporlac therapy in treatment of apthous stomatitis. *Uttar Pradesh State Dent J* 1970;11:7-12.
9. Sharma JK, Kapoor KK, Mukhija RD. Clinical trial of Sporlac in the treatment of recurrent aphthous ulceration. *Uttar Pradesh State Dent J* 1980;11:7-12.
10. Shirodkar NV, Sankholkar PC, Ghosh S, Nulkar SM. Multi-centre clinical assessment of myconip vaginal tablets in non-specific vaginitis. *Indian Pract* 1980;33:207-210.