

Pathogenesis and Functions of *Lactobacillus* as Probiotic

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DESCRIPTION

Lactobacillus is a genus of gram-positive, rod shaped, non-spore forming bacteria. Generally non-motile and rarely motile species of bacteria possess peritrichous flagella. Microaerophilic or facultative anaerobes can survive in both aerobic and anaerobic environments. This bacterium is readily killed by heat but unusually tolerant to acid. It is rarely pathogenic for humans. Hence, its growth is favored by anaerobic and microaerobic conditions, also in presence of carbon dioxide.

This is highly pleomorphic bacteria which may appear on gram stain as coccoid or spiral shaped organism. These are straight or curved rods of varying length and thickness, with parallel sides. In humans, they constitute a significant component of the microbiota at a number of body sites. It currently contains over 180 species such as *L. acidophilus*, *L. algidus*, *L. amylolyticus*, *L. buchneri*, etc.

Pathogenesis

The pathogenic potential of *lactobacillus* is very limited. Systemic human infections due to this bacterium are rare. Serious infections, primary bacteremia and endocarditis are known to occur in elderly individuals and in immunocompromised patients (due to organ transplantation). Endocarditis is the most common clinical disease with high mortality rate. Other infection associated with lactobacilli includes intraabdominal abscess, meningitis, oral infection, conjunctivitis, bacteremia, pleuropneumonia, etc.

Role of *Lactobacillus*

It plays a crucial role as normal flora, as probiotics and in food production, etc. Some species of lactobacilli are commensal microflora of human mucosal membrane in oral cavity, gastrointestinal tract and vagina. Female genital tract is one of the principal colonization sites for human microbiota and plays an important role in the health of female vaginal tract and suppress the overgrowth of *provetella*, *Gardnerella vaginalis*. If the balance between lactobacilli and other bacteria representing the normal biota is disrupted, it results in bacterial vaginosis. *Lactobacillus* species administered in combination with other

probiotics benefits in case of irritable bowel syndrome. It can also be used as probiotics during the cases of infection due to *Helicobacter pylori*. When *lactobacillus* probiotics are administered along with the treatment as an adjuvant, its efficacy is substantially increased and side effects may be decreased. It also helps in returning homeostasis when the gut microbiota experience high level of bacteria.

Some species are used as starter cultures in the industry for controlled fermentation in the production of yogurt, cheese, pickles, beer, cider, kimchi, cocoa and other fermented food as well as animal feeds. *Lactobacillus* grows well in milk and foods made from milk. They are responsible for souring of milk. *Lactobacillus casei* and *Lactobacillus brevis* are some of the most common beer spoilage organisms.

It helps to produce bacteriocins to suppress pathogenic growth of certain bacteria. Also lactic acid and hydrogen peroxide reestablishes the normal bacterial flora and normal vaginal pH.

Treatment

It is difficult to treat cases of endocarditis infection caused by *lactobacillus*. They are resistant to vancomycin which is commonly effective against gram positive bacteria. Hence, combined therapy with penicillin and aminoglycoside is required for bactericidal activity. Most commonly used for treating diarrhea, eczema, rheumatoid arthritis, constipation, colic in infants, hay fever, etc.

CONCLUSION

Lactobacillus is a genus of gram-positive, rod shaped, non-spore forming bacteria. It is rarely pathogenic for humans. These are straight or curved rods of varying length and thickness, with parallel sides. Endocarditis is the most common clinical disease with high mortality rate. It plays a crucial role as normal flora, as probiotics, in food production, etc. *Lactobacillus* species administered in combination with other probiotics benefits in case of irritable bowel syndrome. They are responsible for souring of milk. It helps to produce bacteriocins to suppress pathogenic growth of certain bacteria. It is difficult to treat cases of endocarditis infection caused by *lactobacillus*.

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Received: 01-Jun-2022, Manuscript No. JPH-22-18440; **Editor assigned:** 03-Jun-2022, PreQC No. JPH-22-18440 (PQ); **Reviewed:** 17-Jun-2022, QC No. JPH-22-18440; **Revised:** 24-Jun-2022, Manuscript No. JPH-22-18440 (R); **Published:** 04-Jul-2022, DOI:10.35248/2329-8901.22.10.279.

Citation: Goudoever V (2022) Pathogenesis and Functions of *Lactobacillus* as Probiotic. J Prob Health.10:279.

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