

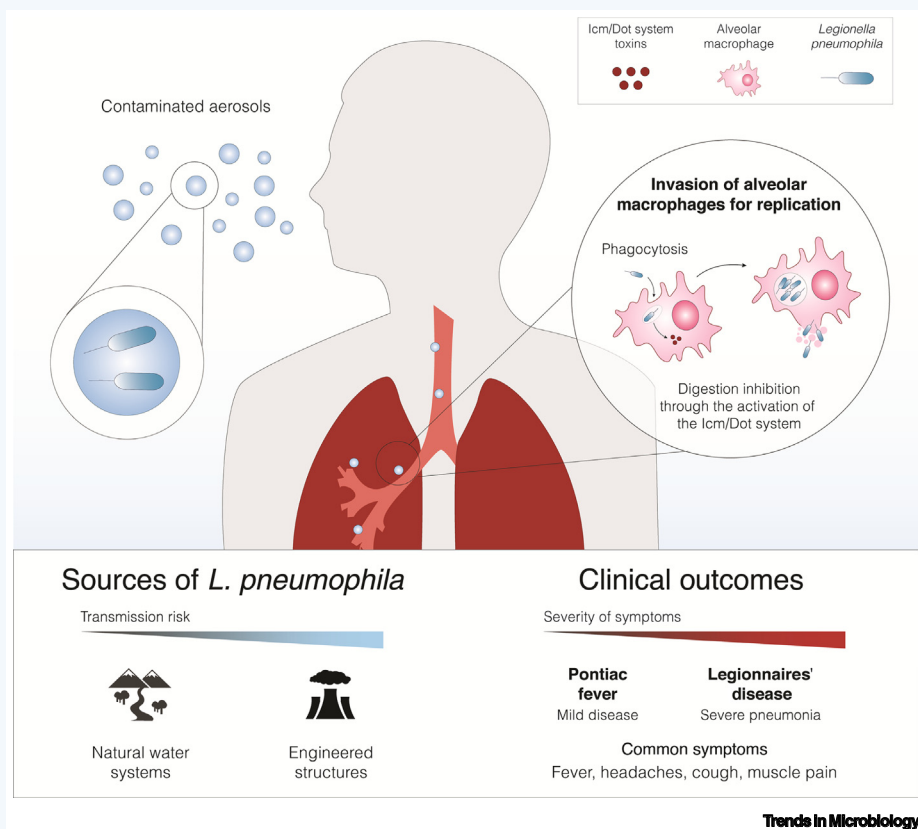
# Legionella pneumophila

Inês G. Gonçalves,<sup>1,2</sup> Lúcia C. Simões,<sup>3,\*</sup> and Manuel Simões<sup>1,\*</sup>

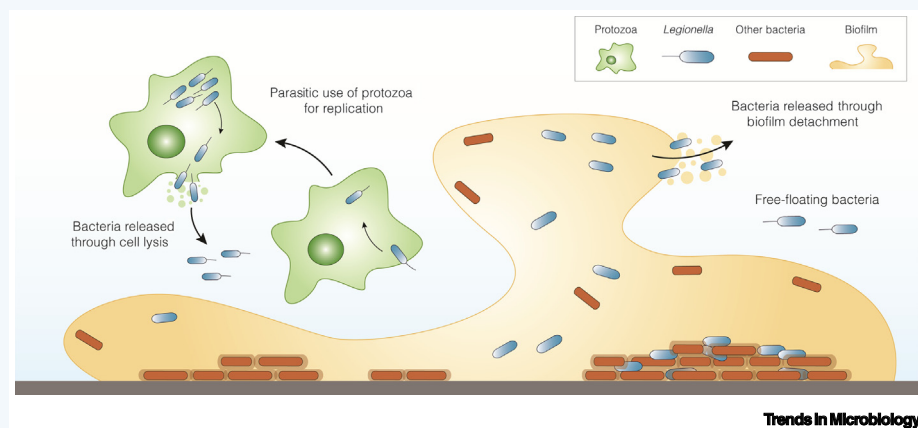
<sup>1</sup>LEPABE, Faculty of Engineering, Department of Chemical Engineering, University of Porto, Porto, Portugal

<sup>2</sup>M2BE, Aragon Institute of Engineering Research, Mechanical Engineering Department, University of Zaragoza, Zaragoza, Spain

<sup>3</sup>CEB, Centre of Biological Engineering, University of Minho, Campus de Gualtar, Braga, Portugal



*Legionella pneumophila* is an intracellular pathogen, ubiquitous in the environment and considered opportunistic. It is the leading cause of legionellosis, which can be present in its nonpneumonic form (Pontiac fever) and acute pneumonic form (Legionnaires' disease – LD). In the soil and aquatic systems, *L. pneumophila* can invade and survive intracellularly in various protozoans. The ability to proliferate within biofilms provides additional protection from environmental stresses, such as disinfection. Human infection by *L. pneumophila* occurs after the inhalation or aspiration of aerosols containing the pathogen. Upon infection, alveolar macrophages can be invaded and used by *L. pneumophila* for replication, resembling the infection of protozoan hosts in the environment. The ability of *L. pneumophila* to overcome the killing mechanisms of phagocytes depends on the Dot/Icm type IV secretion system – a specialized protein translocation system vital for the intracellular survival of the pathogen and for establishing a replicative niche known as the *Legionella*-containing vacuole. Following host cell lysis, the released bacteria infect other host cells, beginning a new cycle of infection.



## KEY FACTS:

*L. pneumophila* was discovered and named after an outbreak at an American Legion convention, in 1976.

Currently, at least 150 legionellosis outbreaks caused by *L. pneumophila* have been reported in peer-reviewed articles.

The outbreak of legionellosis in Murcia (Spain), in 2001, with a total of 800 suspected cases.

*L. pneumophila* is commonly found in natural water systems, soils, and engineered structures using water.

Cooling towers, air conditioning systems, water systems, humidifiers, and whirlpool spas are critical for *L. pneumophila* aerosolization.

Disinfection of probable environmental sources and preventing aerosol formation are critical for disease prevention.

The organism is nutritionally fastidious, requiring L-cysteine and ferric salts.

Buffered charcoal–yeast extract agar supplemented with  $\alpha$ -ketoglutarate medium is used for primary isolation and cultivation.

*L. pneumophila* has more than 15 identified serogroups, of which *L. pneumophila* serogroup 1 is the main causative agent of legionellosis.

Virulence factors include flagella, fimbriae, types II and IV secretion systems, and iron-acquisition mechanisms.

The *L. pneumophila* genome consists of a circular chromosome of ~3.3 Mb.

## DISEASE FACTS:

Pneumonia is the predominant clinical manifestation of *L. pneumophila* infection, and treatment is possible through antibiotic therapy.

\*Correspondence: [luciachaves@deb.uminho.pt](mailto:luciachaves@deb.uminho.pt) (L.C. Simões) and [mvs@fe.up.pt](mailto:mvs@fe.up.pt) (M. Simões).



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## Declaration of Interests

There are no interests to declare.

## Literature

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*L. pneumoniae* accounts for circa 2–15% of all community-acquired pneumonias that require hospitalization in Europe and North America.

Risk groups include individuals over the age of 50, smokers, and those with impaired health, favoring high mortality rates (10–15%).

Human-to-human transmission cases are very rare.

Diagnosis can be confirmed by culture, urinary antigen testing, serological assays, and molecular-based testing.

## TAXONOMY AND CLASSIFICATION:

**KINGDOM:** Bacteria

**PHYLUM:** Proteobacteria

**CLASS:** Gammaproteobacteria

**ORDER:** Legionellales

**FAMILY:** Legionellaceae

**GENUS:** *Legionella*

**SPECIES:** *Legionella pneumophila*

**SUBSPECIES:** *Legionella pneumophila*

*fraseri*, *Legionella pneumophila*

*pascullei*, *Legionella pneumophila*

*pneumophila*

Gram-negative, pleomorphic rod-shaped, aerobic