

120^{ème}
anniversaire

Institut Pasteur



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Institut national
de la santé et de la recherche médicale



CENTRE NATIONAL
DE LA RECHERCHE
SCIENTIFIQUE

Paris, 6 February 2008

Press release

Legionnaire's Disease: towards rapid diagnostic tests

Researchers from the Institut Pasteur and the CNRS, in collaboration with the National Reference Centre for *Legionella* (INSERM) in Lyon, compared the genomic content of dozens of strains of the bacterium responsible for "Legionnaires' disease". Their study, published in *Genome Research*, opens the way for developing rapid diagnostic tests, which are at present lacking for environmental surveillance, and thus for effective prevention of legionellosis.

We hear repeatedly about Legionnaires' disease—a nosocomial disease or several cases of infection grouped that occur in the vicinity of cooling towers—which affects more than a thousand people in France each year. The bacteria involved, *Legionella*, usually live as parasites on unicellular organisms, amoeba, which proliferate in the water. But they are capable of attacking humans, through the respiratory tract, once they spread in the atmosphere by means of aerosols. They then cause lung infections that are fatal in 10-30% of the cases.

A study conducted by Carmen Buchrieser, head of the Biology of Intracellular Bacteria Unit (CNRS URA 2171) at the Institut Pasteur, working jointly with the National Reference Centre for *Legionella* (INSERM U851), aimed to compare the genomes of many different strains of *Legionella*.

The genomic analysis involved 217 strains of *Legionella pneumophila*, the species pathogenic for humans, and 32 strains of *non-pneumophila Legionella*, isolated from patients and the environment.

In particular, this study led to the identification of 3 genes specific of *Legionella pneumophila* serogroup 1, the group of strains that is alone responsible for 84% of legionellosis cases around the world.

It also showed that the *Paris* strain, which caused a nosocomial epidemic in a Paris hospital in 2000, is an epidemic clone responsible for many sporadic cases and outbreaks around the world. For this clone again, specific genes were identified.

"Knowledge about these genes will allow us to develop higher quality, faster, and more effective diagnostic techniques", stressed Buchrieser.

Based on their results, the researchers are now working to develop a real-time PCR test¹ that will allow specific and sensitive detection of *Legionella pneumophila*, and at the same time a rapid and accurate typing of serogroup 1 for this bacterium in samples of water from hospitals and the environment. A test like this would make it possible to identify such a strain in a few hours, while at present several days are required.

1. Polymerase Chain Reaction: an *in vitro* gene amplification technique making it possible to obtain substantial quantities of a specific fragment of DNA that is of a defined length.

Sources:

"Multi-genome analysis identifies a worldwide distributed epidemic Legionella pneumophila clone that emerged within a highly diverse species": **Genome Research**, 6 February 2008

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