# Emergence of NDM-1 and OXA-72 producing Acinetobacter pittii clinical isolates in Lebanon

Ahmad Al Atrouni, Marie-Laure Joly-Guillou, Monzer Hamze, Marie Kempf

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**A. Al Atrouni[1,2], M.-L. Joly-Guillou[2,3], M. Hamze[1] and M. Kempf[2,3]**

1) *Laboratoire Microbiologie Santé et Environnement (LMSE), Ecole Doctorale des Sciences et de Technologie et Faculté de Santé Publique, Université Libanaise, Tripoli, Liban,* 2) *ATOMycA, Inserm Atip-Avenir Team, CRCNA, Inserm U892, 6299 CNRS, University of Angers and* 3) *Laboratoire de Bactériologie,Institut de Biologie en Santé – Centre Hospitalier Universitaire, Angers, France*

## Abstract

*Acinetobacter* spp. have emerged as global opportunistic pathogen causing a wide range of infections. Emergence of carbapenem resistance in these organisms is a matter of great concern. We report here the first detection of *Acinetobacter pittii* clinical isolates in Lebanon carrying either the $bla_{NDM-1}$ or the $bla_{OXA-72}$ gene.



**Keywords:** *Acinetobacter pittii*, $bla_{NDM-1}$, $bla_{Oxa-72}$, carbapenem resistance, Lebanon
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**Corresponding author**: M. Kempf, Laboratoire de Bactériologie, Institut de Biologie en Santé, Centre Hospitalier Universitaire Angers, 4 rue Larrey, 49933 Angers cedex, France
**E-mail:** makempf@chu-angers.fr

The genus *Acinetobacter* comprises to date more than 50 species, among which *Acinetobacter baumannii* is the most clinically relevant, often associated with pneumonia, septicaemia, urinary tract infections, wound infections and meningitis [1]. Treatment of infections caused by this opportunistic bacterium is a challenge as a result of its strong ability to develop resistance to a wide range of antimicrobial agents, especially carbapenems. This resistance trait is mainly related to production of acquired carbapenem-hydrolyzing class D β-lactamases and metallo-β-lactamases [2]. In the last decades, the role of non-*baumannii Acinetobacter* in human infections has been increasingly recognized as a result of advances in molecular biology [3]. There are several reports of multidrug-resistant strains of *Acinetobacter pittii* and *Acinetobacter nosocomialis* in healthcare facilities around the world [4].

This study was initiated by the isolation of two imipenem-resistant *A. pittii* strains recovered in two hospitals in Tripoli, North Lebanon, in 2015. The first one, designated CMUL332, was isolated from the urine of a 4-month-old child who was admitted to the intensive care unit for fever and nephritic syndrome. The second one, CMUL334, was isolated from the urine of a 15-year-old girl patient hospitalized with febrile gastroenteritis. Bacterial identification was performed by matrix-assisted desorption ionization–time of flight mass spectrometry and partial *rpo*B gene sequencing [5]. Antimicrobial susceptibility was determined by the disk diffusion method according to the recommendations of the European Committee on Antimicrobial Susceptibility Testing (http://www.eucast.org). Both isolates were resistant to ticarcillin, ticarcillin/clavulanate and ceftazidime and were of intermediate susceptibility to piperacillin/tazobactam. In contrast, they remained susceptible to aminosides, tigecycline, rifampin, ciprofloxacin and colistin, except strain CMUL332, which was resistant to tobramycin and netilmicin. The Etest method confirmed the carbapenem-resistant phenotype because the minimum inhibitory concentration for meropenem was >32 mg/L and for imipenem either >32 mg/L (CMUL332) or 16 mg/L (CMUL334). Screening of $bla_{OXA-23-like}$, $bla_{OXA-24-like}$, $bla_{OXA-58-like}$ and $bla_{NDM}$ genes by real-time PCR revealed that CMUL332 harboured the $bla_{NDM}$ gene, while CMUL334 carried the $bla_{OXA-24\ like}$ gene. Sequencing of the entire carbapanemase



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genes showed that they encoded for NDM-1 and OXA-72 variants, respectively.

OXA-72-producing *A. pittii* was first described in Colombia in 2012 from a catheter tip–positive culture of a patient who had ischaemic hepatitis and multiorgan failure [6]. This enzyme has subsequently been reported from carbapenem-resistant clinical isolates of *A. pittii* in France [7]. On the other hand, identification of NDM-positive non-*baumannii Acinetobacter* is now increasingly reported worldwide, concomitantly with those of *A. baumannii* isolates. Indeed, recent studies have demonstrated the emergence and the dissemination of NDM-1-producing *A. pittii* in several countries, including China [4,8], Turkey [9] and recently Brazil [10].

This study is the first report of *A. pittii* producing OXA-72 and NDM-1 in Lebanon, which highlights the clinical relevance of this bacterium, in accordance with a series of recent studies [3]. Therefore, surveillance is warranted, and early detection of carbapenemase genes is recommended to avoid their major spread to more clinically relevant bacterial species.

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## Conflict of Interest

None declared.

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