

Antimicrobial resistance and clonality in Acinetobacter baumannii Nemec, A.

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CURRICULUM VITAE

Alexandr Václav Nemec was born on February 7, 1963 in Hradec Králové, Czech Republic. He has three sons. After graduation from the secondary school in Klatovy (southern Bohemia) in 1981, he studied general biology and microbiology at the Faculty of Science, Charles University in Prague. In 1987, he received the degree RNDr. (*Rerum Naturalium Doctoris*) and in 2003 obtained his Ph.D. in medical microbiology at the 3rd Faculty of Medicine, Charles University, with a thesis on the taxonomy and molecular typing of strains of the genus *Acinetobacter*. In 2006, he defended a habilitation thesis entitled "Study of medically relevant strains of *Acinetobacter*" to become an associate professor in medical microbiology at the Charles University.

After graduation in 1987, he worked as a bacteriologist in the Bacteriological Laboratory of the Agricultural Cooperative at Jílové u Prahy, In 1990, he joined the Working Group of Clinical Microbiology headed by Professor Jiri Schindler at the Institute of Hygiene and Epidemiology (currently the National Institute of Public Health). At present, he is a senior researcher and head of the Department of Bacterial Genetics and Mycobacteria at the National Institute of Public Health. In 1993-1994 and 2003-2004, he was a part-time lecturer at the Department of Medical Microbiology of the 3rd Medical Faculty, Charles University. From 2005 to 2009, he was a part-time senior researcher at the Department of Immunology of the 2nd Medical Faculty in Prague. Since 2007, he has been a lecturer in medical bacteriology at the Faculty of Science, Charles University. From 1997 onwards he has collaborated with Dr. Lenie Dijkshoorn at the Department of Infectious Diseases of the Leiden University Medical Center on the taxonomy and epidemiology of Acinetobacter and has been a frequent visitor of the Department. He was the principal investigator of seven successfully completed projects supported by Czech grant agencies. His current research is focused on the taxonomy of the genus Acinetobacter, population structure of Acinetobacter baumannii and Pseudomonas aeruginosa and the genetic basis and evolution of resistance mechanisms in clinical strains of these species.

LIST OF PUBLICATIONS

Original articles in peer reviewed international journals

Nemec A, Musílek M, Šedo O, De Baere T, Maixnerová M, van der Reijden TJK, Zdráhal Z, Vaneechoutte M, Dijkshoorn L. Acinetobacter bereziniae sp. nov. and Acinetobacter guillouiae sp. nov., to accommodate, respectively, Acinetobacter genomic species 10 and Acinetobacter genomic species 11. Int J Syst Evol Microbiol. In press.

Vaneechoutte M, Nemec A, Musílek M, van der Reijden TJK, van den Barselaar M, Tjernberg I, Calame W, Fani R, De Baere T, Dijkshoorn L. (2009) Description of *Acinetobacter venetianus* (ex Di Cello et al. 1997) sp. nov. *Int J Syst Evol Microbiol* 59: 1376–1381.

Nemec A, Musílek M, Maixnerová M, De Baere T, van der Reijden TJK, Vaneechoutte M, Dijkshoorn L. (2009) *Acinetobacter beijerinckii* sp. nov. and *Acinetobacter gyllenbergii* sp. nov., haemolytic organisms isolated from humans. *Int J Syst Evol Microbiol* 59: 118–124.

Nemec A, Musílek M, Vaneechoute M, Falsen E, Dijkshoorn L, Tang YW, Stratton CW, Mellmann A, Harmsen D. (2008) Lack of evidence for "Acinetobacter septicus" as a species different from Acinetobacter ursingii? J Clin Microbiol 46: 2826–2827.

Nemec A, Krizova L, Diancourt L, Maixnerova M, J. K. van der Reijden T, Brisse S, van den Broek P, Dijkshoorn L. (2008) Emergence of carbapenem resistance in *Acinetobacter baumannii* in the Czech Republic is associated with the spread of multidrug resistant strains of European clone II. *J Antimicrob Chemother* 62: 484–489.

Vaneechoutte M, De Baere T, Nemec A, Musilek M, van der Reijden TJK, Dijkshoorn L. (2008) Reclassification of *Acinetobacter grimontii* Carr *et al.* 2003 as a later synonym of *Acinetobacter junii* Bouvet and Grimont 1986. *Int J Syst Evol Microbiol* 58: 937–940.

Dijkshoorn L, Nemec A, Seifert H. (2007) An increasing threat in the hospital: multidrug resistant *Acinetobacter baumannii. Nat Rev Microbiol* 5: 939–951.

Nemec A, Maixnerová M, van der Reijden TJK, van den Broek P, Dijkshoorn L. (2007) Relationship between the AdeABC efflux system gene content, netilmicin susceptibility and multidrug resistance in a genotypically diverse collection of *Acinetobacter baumannii* isolates. *J Antimicrob Chemother* 60: 483–489.

Vosahlikova S, Drevinek P, Cinek O, Pohunek P, Maixnerova M, Urbaskova P, van den Reijden TJK, Dijkshoorn L, Nemec A. (2007) High genotypic diversity of *Pseudomonas aeruginosa* strains isolated from patients with cystic fibrosis in the Czech Republic. *Res Microbiol* 158: 324–329.

Rodriguez-Bańo J, Martí S, Ribera A, Fernández-Cuenca F, Dijkshoorn L, Nemec A, Pujol M, Vila J. (2006) Nosocomial bacteremia due to a yet unclassified *Acinetobacter* genomic species 17-like strain. *J Clin Microbiol* 44: 1587–1589.

- Vaneechoutte M, Young DM, Ornston LN, De Baere T, Nemec A, van der Reijden TJK, Dijkshoorn L. (2006) Naturally transformable *Acinetobacter sp.* strain ADP1 belongs to the newly described species *Acinetobacter baylyi*. *Appl Environ Microbiol* 72: 932–936.
- **Huys G, Cnockaert M, Nemec A, Swings J. (2005)** Sequence-based typing of *adeB* as a potential tool to identify intraspecific groups among clinical strains of multi-drug resistant *Acinetobacter baumannii. J Clin Microbiol* 43: 5327–5331.
- Huys G, Cnockaert M, Nemec A, Dijkshoorn L, Brisse S, Vaneechoutte M, Swings J. (2005) Repetitive DNA element (rep)-PCR fingerprinting and antibiotic resistance of pan-European multiresistant *Acinetobacter baumannii* clone III strains. *J Med Microbiol* 54: 851–856.
- Huys G, Cnockaert M, Vaneechoutte M, Woodford N, Nemec A, Dijkshoorn L, Swings J. (2005) Distribution of tetracycline resistance genes in genotypically related and unrelated multi-resistant *Acinetobacter baumannii* strains from different European hospitals. *Res Microbiol* 156: 348–355.
- Dijkshoorn L, van Aken E, Shunburne L, van der Reijden TJK, Bernards AT, Nemec A, Towner KJ. (2005) Prevalence of *Acinetobacter baumannii* and other *Acinetobacter* spp. in faecal samples from non-hospitalised individuals. *Clin Microbiol Infect* 11: 329–332.
- **Dijkshoorn L, Brouwer CP, Boogaards S, Nemec A, van den Broek PJ, Nibbering P. (2004)** The synthetic N-terminal peptide of human lactoferrin hLF(1-11) is highly effective against experimental infection caused by multidrug-resistant *Acinetobacter baumannii*. *Antimicrob Agents Chemother* 48: 4919–4921.
- <u>Nemec A</u>, **Dolzani L**, **Brisse S**, van den Broek P, Dijkshoorn L. (2004) Diversity of aminoglycoside resistance genes and their association with class 1 integrons among strains of pan-European *Acinetobacter baumannii* clones. *J Med Microbiol* 53: 1233–1240.
- <u>Nemec A</u>, **Dijkshoorn L**, **van der Reijden TJK.** (2004) Long-term predominance of two pan-European clones among multi-resistant *Acinetobacter baumannii* strains in the Czech Republic. *J Med Microbiol* 53: 147–153.
- Nemec A, Dijkshoorn L, Cleenwerck I, De Baere T, Janssens D, van der Reijden TJK, Ježek P, Vaneechoutte M. (2003) *Acinetobacter parvus* sp. nov., a small colony-forming species isolated from human clinical specimens. *Int J Syst Evol Microbiol* 53: 1563–1567.
- Melter O, Hercík K, Weyant RS, Janeček J, Nemec A, Mecera J, Gonzorová L, Branny P. (2003) Detection and characterization of feline *Bartonella henselae* in the Czech Republic. *Vet Microbiol* 93: 261–273.
- **Dřevínek P, Hrbáčková H, Cinek O, Bartošová J, Nyč O, Nemec A, Pohunek P. (2002)** Direct PCR detection of *Burkholderia cepacia* complex and identification of its genomovars by using sputum as source of DNA. *J Clin Microbiol* 40: 3485–3488.

Volf P, Kiewegová A, Nemec A. (2002) Bacterial colonization in the gut of *Phlebotomus duboscqi* (Diptera: Psychodidae): transtadial passage and the role of female diet. *Folia Parasitol* 49: 73–77.

Pantophlet R, Severin JA, Nemec A, Brade L, Dijkshoorn L, Brade H. (2002) Identification of *Acinetobacter* isolates from species belonging to the *Acinetobacter calcoaceticus-Acinetobacter baumannii* complex with monoclonal antibodies specific for O antigens of their lipopolysaccharides. *Clin Diagn Lab Immunol* 9: 60–65.

Nemec A, De Baere T, Tjernberg I, Vaneechoutte M, van der Reijden TJK, Dijkshoorn L. (2001) *Acinetobacter ursingii* sp. nov. and *Acinetobacter schindleri* sp. nov., isolated from human clinical specimens. *Int J Syst Evol Microbiol* 51:1891–1899.

Pantophlet R, Nemec A, Brade L, Brade H, Dijkshoorn L. (2001) O-antigen diversity among *Acinetobacter baumannii* strains from the Czech Republic and Northwestern Europe, as determined by lipopolysaccharide-specific monoclonal antibodies. *J Clin Microbiol* 39: 2576–2580.

Nemec A, Dijkshoorn L, Ježek P. (2000) Recognition of two novel phenons of the genus *Acinetobacter* among non-glucose-acidifying isolates from human specimens. *J Clin Microbiol* 38: 3937–3941.

Nemec A, Janda J, Melter O, Dijkshoorn L. (1999) Genotypic and phenotypic similarity of multiresistant *Acinetobacter baumannii* isolates in the Czech Republic. *J Med Microbiol* 48: 287–296.

Aldová E, Schindler J, Šourek J, Nemec A, Urbášková P. (1997) Detection and isolation of *Citrobacter sedlakii*. *Zentralbl Bakteriol* 285: 389–396.

<u>Nemec A</u>, Haywood-Farmer A, Mackie GA. (1995) Conserved amino acid residues in the primary structure of ribosomal protein S20 from selected Gram-negative bacteria. *Biochim Biophys Acta* 1263: 154–158.

Urbášková P, Schindler J, Aldová E, Nemec A. (1993) Antibiotic susceptibility of mesophilic aeromonads isolated in Czechoslovakia. *Med Microbiol Lett* 2: 152–158.

Original articles in peer-reviewed Czech journals

Nemec A. (2008) [Multidrug resistant *Acinetobacter baumannii*.] *Klin Mikrobiol InfekcLek* 14: 162–167. In Czech.

Nemec A, Maixnerová M, Musílek M. (2008) [Multidrug resistant clones of *Pseudomonas aeruginosa* in the Czech Republic.] *Klin Mikrobiol Infekc Lek* 14: 168–172. In Czech.

Nemec A, Maixnerová M. (2004) [Aminoglycoside resistance of *Acinetobacter baumannii* hospital strains in the Czech Republic.] *Klin Mikrobiol Infekc Lek* 10: 223–228. In Czech.

<u>Nemec A, van der Reijden TJK, Dijkshoorn L. (2003)</u> [Multiresistant clones of *Acinetobacter baumannii* in the Czech Republic.] *Klin Mikrobiol Infekc Lek* 9: 130–137. In Czech.

Nemec A. (1999) [Use of the disk diffusion test for epidemiological typing of multiresistant *Acinetobacter baumannii* strains.] *Klin Mikrobiol Infekc Lek* 5: 287–297. In Czech.

Nemec A, Urbášková P, Grimont F, Vránková J, Melter O, Schindler J. (1996) [Identification and typing of hospital strains of the *Acinetobacter calcoaceticus - Acinetobacter baumannii* complex.] *Epidemiol Mikrobiol Imunol* 45: 71–82. In Czech.

Nemec A. (1996) [Taxonomy of the genus *Acinetobacter*.] *Epidemiol Mikrobiol Imunol* 45: 23–29. In Czech.

Aldová E, Schindler J, Nemec A, Šourek J, Urbášková P. (1995) [Biochemical characteristics of *Citrobacter sedlakii*]. *Epidemiol Mikrobiol Imunol* 44: 57–64. In Czech.

Aldová E, Schindler J, Urbášková P, Nemec A. (1994) [Biochemical identification of aeromonads.] *Epidemiol Mikrobiol Imunol* 43: 55–60. In Czech.

Book chapters

Dijkshoorn L, Nemec A. (2008) The diversity of the genus *Acinetobacter*. In: Gerischer U: *Acinetobacter* Molecular Biology. Caister Academic Press. Norfolk UK. Pages 1–34. ISBN 978-1-904455-20-2.

<u>Nemec A.</u> (2006) [Mechanisms of resistance.] In: Ján Gajdošík J, Moro M (eds). [Diagnosis and therapy of infectious diseases in ambulatory praxis.] Dr. Josef Raabe. Bratislava, Slovakia. Pages C1/1–C1/8. ISBN 80-89182-08-9. In Slovak.

Urbášková P, Toršová V, Nemec A. (1995) [Antibiotics in patients with nosocomial infections.] In: Šrámová H *et al* [Nosocomial infections]. Maxdorf-Jessenius. Praha, Czech Republic. Pages 135–154. In Czech.

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