

CURRICULUM VITAE

Name **Ana Rute Neves**
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PROFESSIONAL ACTIVITY

- 2012 – Pres. **Senior Researcher**
Novo Nordisk Foundation Center for Biosustainability
Technical University of Denmark, Hørsholm (Denmark).
- 2004 – 2012 **Auxiliary Researcher/Head of laboratory.**
Lactic Acid Bacteria & *in vivo* NMR group. Associate Laboratory at Instituto de Tecnologia Química e Biológica (ITQB/UNL), Oeiras (Portugal).
(Members in January 2011: 1 Post-doc, 3 Ph.D. students, 4 assistant researchers, 1 master student)
(<http://www.itqb.unl.pt/research/biology/lactic-acid-bacteria-in-vivo-nmr>).

ACADEMIC DEGREES AND EDUCATION

- 2001 – 2003 **Post-doctoral fellow**
Department of Molecular Genetics (19 months), University of Groningen (The Netherlands) and Cell Physiology & NMR group (4 months) at ITQB/UNL (Portugal).
Supervisors: Oscar P. Kuipers (RUG) and Helena Santos (ITQB/UNL).
Subject: Regulation of sugar metabolism in *Lactococcus lactis*: an integrated approach to improve the metabolic traits of a food microorganism.
- 1997 – 2001 **Ph.D. in Biochemistry**
Cell Physiology & NMR group at ITQB/UNL (Portugal).
Supervisor: Helena Santos.
Ph.D. thesis: Metabolic strategies to reroute carbon fluxes in *Lactococcus lactis*: kinetics of intracellular metabolite pools by *in vivo* Nuclear Magnetic Resonance.
- 1992 – 1996 **“Licenciatura” in Biochemistry**, Faculdade de Ciências e Tecnologia, Universidade de Coimbra, Coimbra (Portugal).
Trainee (one year) in Neurobiology, Centro de Neurociências, Faculdade de Ciências e Tecnologia da Universidade de Coimbra.
Supervisor: Arsélio Pato de Carvalho.
Subject: Glutamate toxicity in cultured chick retina neurons.

MAIN RESEARCH AREAS

Microbial physiology.
Carbon metabolism in Streptococcaceae (dairy and pathogenic).
Metabolic networks and regulation in Gram-positive bacteria.
Application of Nuclear Magnetic Resonance techniques for metabolite profiling.
Metabolomics.
Metabolic engineering and synthetic biology applied to lactic acid bacteria.
Systems biology.

RESEARCH INTERESTS

My research interests are primarily directed to the identification and comprehension of the factors/processes that control cellular metabolism in Gram-positive bacteria. The elucidation of molecular mechanisms involved in carbon metabolism, and carbohydrate uptake and degradation, in particular, have been at the core of my research. This subject is especially relevant when targeting fermentative bacteria, for which carbohydrate metabolism is central to physiology. The insights gained from these studies provide the firm basis for two main lines of research:

- (i) metabolic engineering of bacteria for synthesis of added-value compounds
- (ii) investigation of the relationship between carbohydrate metabolism and virulence in fermentative Gram-positive pathogens

In my laboratory we use as main model organisms for (i) and (ii) the dairy Lactic Acid Bacterium *Lactococcus lactis* and the human pathogen *Streptococcus pneumoniae*, respectively.

The molecular mechanisms governing sugar utilization in *S. pneumoniae* are largely unknown. The investigations initiated in my laboratory in mid-2006 focus on the study of carbohydrate transport and initial steps of sugar degradation, putative central carbon regulators, and how carbon metabolism controls or influences the expression of virulence factors. This initiative was fostered by the perception of a direct connection between sugar metabolism for fitness in the host and the importance of this organism for human well-being.

I have also pursued a line of research, initiated during my Ph.D. studies, which aims at characterizing central metabolism and regulatory networks in the model organism *L. lactis* using global approaches. The applied goal of this work consists in using the data generated to direct metabolic engineering strategies for the production of added-value compounds, such as health-promoting polyphenols. Thus far we have succeeded in producing mannitol and 2,3-butanediol in yields close to the maximal theoretical values.

Besides these two major lines of research and through ongoing collaborations I am also engaged in the study of central carbon pathways in other model Gram-positive microorganisms, namely *Staphylococcus aureus*, *Corynebacterium glutamicum* and *Bifidobacterium animalis*.

OWN FUNDED PROJECTS

PhytoLac - Engineered *Lactococcus lactis* for the optimized production of nutraceutical plant-derived polyphenols.

PTDC/EBB-EBI/113727/2009, Fundação para a Ciência e a Tecnologia (Portugal).

Duration: March 2011 – February 2014. Funding: 159.024,00 Euro.

PI: [Ana Rute Neves](#)

Collaborator: Oscar P. Kuipers (RUG, The Netherlands).

PneumoSyS - A systems biology approach to the role of pneumococcal carbon metabolism in colonization and invasive disease.

PTDC/SAU-MII/100964/2008, Fundação para a Ciência e a Tecnologia (Portugal).

Duration: April 2010 – March 2013. Funding: 199.650,00 Euro.

PI: [Ana Rute Neves](#)

Collaborators: Susana Vinga (INESC-ID, Portugal), Peter Andrew and Hasan Yesilkaya (U. Leicester, UK).

PneumoCaPTS - Regulation of virulence factors by glucose-dependent catabolite repression.

PTDC/BIA-MIC/099963/2008, Fundação para a Ciência e a Tecnologia (Portugal).

Duration: January 2010 – December 2012. Funding: 198.804,00 Euro.

PI: [Ana Rute Neves](#)

Collaborators: Margarida Archer (ITQB/UNL, Portugal), Oscar P. Kuipers (RUG, The Netherlands), Jetta Bijlsma (UMCG, The Netherlands) and Pedro Lamosa (ITQB/UNL, Portugal).

Novel roles of *Lactococcus lactis* cellobiose-PTS system in sugar metabolism and bacteriocin activity.

Acções Integradas Luso-Espanholas – 2009. Acção Nº E-67/09. Funding: 8.000,00 Euro.

Portuguese PI: [Ana Rute Neves](#)

Spanish PI: Beatriz Martínez Fernández (IPLA-CSIC, Spain).

Investigation on the link between central carbon metabolism and capsule production in the human pathogen *Streptococcus pneumoniae*.

POCTI/BIA-MIC/56235/2004, Fundação para a Ciência e a Tecnologia (Portugal).

Duration: January 2006 – September 2007. Funding: 35.000,00 Euro.

PI: [Ana Rute Neves](#)

Collaborators: Helena Santos (ITQB/UNL, Portugal) and Oscar P. Kuipers (RUG, The Netherlands).

PARTICIPATION IN RESEARCH PROJECTS

Bio-based production of chemical building blocks: *Corynebacterium glutamicum* as a platform for new and efficient bioprocesses (BioProChemBB).

ERA-IB project coordinated by Bernard J. Eikmanns, University of Ulm, Germany. Portuguese participation: Helena Santos (PI) and [Ana Rute Neves](#). Duration: February 2009 - August 2012.

Integrated view of the early steps in bacterial cell wall synthesis.

PTDC/BIA-MIC/67845/2006. Fundação Fundação para a Ciência e a Tecnologia (Portugal).

Duration: January 2008 - December 2010. PI: Mariana Pinho (ITQB, Portugal). Collaborators: [Ana Rute Neves](#) and Sérgio Filipe (ITQB, Portugal).

DynaMo: dynamical modeling, control and optimization of metabolic networks.

PTDC/EEA-ACR/69530/2006. Fundação Fundação para a Ciência e a Tecnologia (Portugal).

Duration: September 2007 - August 2010. PI: Susana Vinga (INESC-ID, Portugal). Collaborators: Helena Santos/[Ana Rute Neves](#) (ITQB, Portugal), Jonas Almeida (Univ. Texas, USA), Eberhard E. Voit (GeorgiaTech, USA).

Global experimental approaches to study central metabolism in *Lactococcus lactis*: modulation of the levels of key-enzymes.

POCTI-BIO/48333/2002. FCT/Sapiens02 Program, Fundação para a Ciência e a Tecnologia (Portugal). February 2004 - January 2007. PI: Helena Santos (ITQB, Portugal).

Fermentation of food products: optimised lactic acid bacteria strains with reduced potential to accumulate biogenic amines.

QLRT-2001-02380-DECARBOXYLATE. EU Fifth Framework Program. Duration: March 2003 - February 2006. PI (Portuguese team): Helena Santos (ITQB, Portugal).

Increase in nutritional value of food raw materials by addition, activity, or *in situ* production of microbial nutraceuticals.

QLK1-CT-2000-01376. EU Fifth Framework Program. Duration: January 2000 - September 2004. PI (Portuguese team): Helena Santos (ITQB). PI (Dutch team): Oscar P. Kuipers (RUG).

Utilização de *Lactococcus lactis* como reatores biológicos: modelação do metabolismo de carbo-hidratos com base em medições não-invasivas.

PRAXIS/C/BIA/11072/98. PRAXIS XXI Program, Fundação para a Ciência e a Tecnologia (Portugal). Duration: June 1999 – May 2001. PI: Helena Santos (ITQB, Portugal).

Caracterização e modelização de fluxos metabólicos em bactérias lácticas visando o melhoramento de estirpes industriais.

PRAXIS/PCNA/P/BIO/39/96. PRAXIS XXI Program, Fundação para a Ciência e a Tecnologia (Portugal). June 1997 - May 1999. PI: Helena Santos (ITQB, Portugal).

Cell engineering of *Lactococcus lactis*.

BIO 4-CT 96-0498. BIOTECH Program, CE-DGXII. Duration: 1996-1999. PI (Portuguese team): Helena Santos (ITQB, Portugal).

FUNDED HUMAN RESOURCE GRANTS

2012 – 2014 Rafael Costa. Post-Doc application. SFRH/BPD/80784/2011. **A metabolic network modelling and systems analysis of *Streptococcus pneumoniae* central metabolism in colonization and invasive disease.**

Co-supervisor: [Ana Rute Neves](#).

- 2011 – 2014 Paula Gaspar. Post-Doc application. SFRH/BPD/31251/2006. **Engineering *Lactococcus lactis* as a platform for the production of nutraceutical plant-derived polyphenols.**
Principal Supervisor: [Ana Rute Neves](#).
- 2011 – 2015 Dusica Rados. Ph. D. application. SFRH/BD/73265/2010. **Metabolic Engineering of *Corynebacterium glutamicum* for the production of four-carbon polyols under biotransformation conditions.**
Co-supervisor: [Ana Rute Neves](#).
- 2011 – 2015 Débora Tavares. Ph. D. application. SFRH/BD/70147/2010. **The nasopharyngeal ecosystem: studies on the nature of bacterial interspecies competition.**
Co-supervisor: [Ana Rute Neves](#).
- 2009 – 2013 Laura Paixão. Ph. D. application. SFRH/BD/46997/2008. **Role of sugar sources in *Streptococcus pneumoniae* colonization of the nasopharynx.**
Principal Supervisor: [Ana Rute Neves](#).
- 2008 – 2011 Paula Gaspar. Post-Doc application. SFRH/BPD/31251/2006. **An integrative study to unveil regulatory mechanisms underlying sugar metabolism in the probiotic *Bifidobacteria*.**
Principal Supervisor: [Ana Rute Neves](#).
- 2007 - 2011 Sandra Carvalho. Ph.D. application. SFRH/BD/35947/2007. **Novel insights into the molecular mechanisms underlying catabolic control and their relation to capsule production in *Streptococcus pneumoniae*.**
Principal Supervisor: [Ana Rute Neves](#).
- 2007 - 2011 Ana Lúcia Carvalho. Ph.D. application. SFRH/BD/30419/2006. **A systems biology approach towards the development of lactic acid bacteria with improved resistance to acid stress.**
Co-Supervisor: [Ana Rute Neves](#).
- 2005 - 2008 Rute Castro. Ph.D. application. SFRH/BD/17718/2004. **Regulation of central carbon metabolism in dairy and pathogenic lactic acid bacteria.**
Co-Supervisor: [Ana Rute Neves](#).

PUBLICATIONS

International Peer-Reviewed Journals

- P. Nogly, R. Castro, M. de Rosa, [A. R. Neves](#), H. Santos, M. Archer. **Production and crystallization of α -phosphoglucosyltransferase from *Lactococcus lactis*.** *Acta Crystallogr. Sect. F Struct. Biol. Cryst. Commun.* 2012 **68**, 1113-1115.
- A. Solopova, H. Bachmann, B. Teusink, J. Kok, A. R. Neves & O. P. Kuipers. **A specific mutation in the promoter region of the silent *cel* cluster accounts for the appearance of lactose-utilizing *Lactococcus lactis* MG1363.** *Appl. Environ. Microbiol.* **78**, 5612-5621 (2012).
- S. M. Carvalho, T. G. Kloosterman, O. P. Kuipers & [A. R. Neves](#). **CcpA ensures optimal metabolic fitness of *Streptococcus pneumoniae*.** *PLoS ONE.* **6**, e26707 (2011).
- A. B. Campelo, P. Gaspar, C. Roces, A. Rodríguez, J. Kok, O. P. Kuipers, [A. R. Neves](#)^a, B. Martínez^a. **The Lcn972-bacteriocin plasmid pBL1 impairs cellobiose metabolism in *Lactococcus lactis*.** *Appl. Environ. Microbiol.* **77**, 7576-7585 (2011). ^aBoth authors contributed equally to this work.
- P. Gaspar, [A. R. Neves](#)^a, M. J. Gasson, C. A. Shearman & H. Santos. **High yields of 2,3-butanediol and mannitol in *Lactococcus lactis* through engineering NAD⁺ cofactor recycling.** *Appl. Environ. Microbiol.* **77**, 6826-6835 (2011). ^aCorresponding author.
- A. L. Carvalho, F. S. Cardoso, A. Bohn, [A. R. Neves](#) & H. Santos. **Engineering trehalose synthesis in *Lactococcus lactis* for improved stress tolerance.** *Appl. Environ. Microbiol.* **77**, 4189-4199 (2011).

- A. R. Neves^a, W. A. Pool, A. Solopova, J. Kok, H. Santos, O. P. Kuipers. **Towards enhanced galactose utilization by *Lactococcus lactis***. *Appl. Environ. Microbiol.* **76**, 7048-7060 (2010).
^aCorresponding author.
- S. Vinga, A. R. Neves, H. Santos, B. W. Brandt & S. A. L. M. Kooijman. 2010. **Subcellular metabolic organization in the context of Dynamic Energy Budget and Biochemical Systems theories**. *Philos. Trans. R Soc. Lond. B Biol. Sci.* **365**, 3429-3442 (2010).
- K. Pokusaeva, A. R. Neves, A. Zomer, M. O'Connell-Motherway, J. MacSharry, P. Curley, G. F. Fitzgerald & D. van Sinderen. **Ribose utilization by the human commensal *Bifidobacterium breve* UCC2003**. *Microb. Biotechnol.* **3**, 311-323 (2010).
- H. Yesilkaya, F. Spissu, S. M. Carvalho, V. S. Terra, K. A. Homer, R. Benisty, N. Porat, A. R. Neves & P. W. Andrew. **Pyruvate formate lyase is required for pneumococcal fermentative metabolism and virulence**. *Infect. Immun.* **77**, 5418-5427 (2009).
- R. Castro, A. R. Neves^a, L. L. Fonseca, W. A. Pool, J. Kok, O. P. Kuipers & H. Santos. **Characterization of the individual glucose uptake systems of *Lactococcus lactis*: mannose-PTS, cellobiose-PTS and the novel GlcU permease**. *Mol. Microbiol.* **71**, 795-806 (2009) ^aCorresponding author.
- A. Z. Andersen, A. L. Carvalho, A. R. Neves, H. Santos, U. Kummer & L. F. Olsen. **The metabolic pH response in *Lactococcus lactis*: an integrative experimental and modelling approach**. *Comput. Biol. Chem.* **33**, 71-83 (2009).
- C. Fonseca, A. R. Neves, A. M. M. Antunes, J. P. Noronha, B. Hahn-Hägerdal, H. Santos & I. Spencer-Martins. ***In vivo* ¹³C-NMR to unravel L-arabinose metabolism in yeast**. *Appl. Environ. Microbiol.* **74**, 1845-1855 (2008).
- C. Sánchez, A. R. Neves, J. Cavalheiro, M.M. dos Santos, N. García-Quintáns, P. López & H. Santos. **The contribution of citrate metabolism to the growth of *Lactococcus lactis* CRL264 at low pH**. *Appl. Environ. Microbiol.* **74**, 1136-44 (2008).
- P. Gaspar, A. R. Neves, C. A. Shearman, M. J. Gasson, A. M. Baptista, D. L. Turner, C. M. Soares & H. Santos. **The lactate dehydrogenases encoded by the *ldh* and *ldhB* genes in *Lactococcus lactis* exhibit distinct regulation and catalytic properties - comparative modeling to probe the molecular basis**. *FEBS J.* **274**: 5924-5936 (2007).
- A. R. Neves, W. A. Pool, R. Castro, A. Mingote, F. Santos, J. Kok, O. Kuipers & H. Santos. **The α -phosphoglucosyltransferase of *Lactococcus lactis* is unrelated to the α -D-phosphohexosyltransferase superfamily and encoded by the essential gene *pgmH***. *J. Biol. Chem.* **281**, 36864-36873, (2006).
- E. O. Voit, J. Almeida, S. Marino, R. Lall, G. Goel, A. R. Neves & H. Santos. **Regulation of glycolysis in *Lactococcus lactis*: an unfinished systems biological case study**. *Syst. Biol. (Stevenage)*. **153**, 286-298 (2006).
- W. A. Pool, A. R. Neves, J. Kok, H. Santos & O. Kuipers. **Natural sweetening of food products by engineering *Lactococcus lactis* towards glucose production**. *Metab. Eng.* **8**, 456-464 (2006).
- E. O. Voit, A. R. Neves & H. Santos. **The intricate side of systems biology**. *Proc. Nat. Acad. Sci. USA.* **103**, 9452-9457 (2006).
- A. R. Neves, W. A. Pool, J. Kok, O. Kuipers & H. Santos. **Overview on sugar metabolism and its control in *Lactococcus lactis* - the input from *in vivo* NMR**. *FEMS Microbiol. Rev.* **29**, 531-554 (2005).
- P. Gaspar, A. R. Neves, A. Ramos, M. J. Gasson, C. Shearman & H. Santos. **Engineering *Lactococcus lactis* for the production of mannitol: high yields from food-grade strains deficient in lactate dehydrogenase and the mannitol transport pathway**. *Appl. Environ. Microbiol.* **70**, 1466-1474 (2004).
- A. Ramos, A. R. Neves, R. Ventura, C. Maycock, P. López & H. Santos. **The effect of overproduction of pyruvate kinase on glucose metabolism in *Lactococcus lactis***. *Microbiology-SGM.* **150**, 1103-1111 (2004).
- R. Anderson, M. Latorre-Esteves, A. R. Neves, S. Lavu, O. Medvedik, C. Taylor, K. T. Howitz, H. Santos & D. A. Sinclair. **Yeast life-span extension by calorie restriction is independent of NAD⁺ fluctuation**. *Science.* **302**, 2124-2126 (2003).

A. R. Neves, A. Ramos, H. Costa, I. I. Van Swam, J. Hugenholtz, M. Kleerebezem, W. M. de Vos & H. Santos. **Effect of different NADH oxidase levels on glucose metabolism by *Lactococcus lactis*: kinetics of intracellular metabolite pools determined by *in vivo* nuclear magnetic resonance.** *Appl. Environ. Microbiol.* **68**, 6332-6342 (2002).

A. R. Neves, A. Ramos, C. Shearman, M. J. Gasson & H. Santos. **Characterization of mannitol metabolism in *Lactococcus lactis* MG1363 and a mutant deficient in lactate dehydrogenase.** *Microbiology-SGM* **148**, 3467-3476 (2002).

A. Ramos, A. R. Neves & H. Santos. **Metabolism of lactic acid bacteria studied by nuclear magnetic resonance.** *Antonie van Leeuwenhoek* **82**, 249-261 (2002).

A. R. Neves, R. Ventura, N. Mansour, C. Shearman, M. J. Gasson, C. Maycock, A. Ramos, & H. Santos. **Is the glycolytic flux in *Lactococcus lactis* primarily controlled by the redox charge? Kinetics of NAD⁺ and NADH pools determined *in vivo* by ¹³C-NMR.** *J. Biol. Chem.* **277**, 28088-28098 (2002).

A. R. Neves, A. Ramos, C. Shearman, M. J. Gasson, J. Almeida & H. Santos. **Metabolic characterization of *Lactococcus lactis* deficient in lactate dehydrogenase using ¹³C-NMR.** *Eur. J. Biochem.* **267**, 3859-3868 (2000).

A. R. Neves, A. Ramos, M. C. Nunes, M. Kleerebezem, J. Hugenholtz, W. M. de Vos, J. Almeida & H. Santos. ***In vivo* NMR studies of glycolytic kinetics in *Lactococcus lactis*.** *Biotechnol. Bioeng.* **64**, 200-212 (1999).

I. L. Ferreira, C. B. Duarte, A. R. Neves & A. P. Carvalho. **Culture medium components modulate retina cell damage induced by glutamate, kainate or "chemical ischemia".** *Neurochem. Int.* **32**, 387-396 (1998).

Conference Proceedings

R. Costa, D. Machado, A. R. Neves & S. Vinga. **Multi-level dynamic modeling in biological systems: application of hybrid Petri nets to network simulation.** To be presented as a poster at Bioinformatics 2012. February 1-4, Vilamoura, Portugal (2012).

A. Domingues, S. Vinga, P. Gaspar, A. R. Neves, H. Santos & J. M. Lemos. **Consistent parameter estimation in metabolic networks: a case study.** Proceedings of Jornadas de Bioinformática. November 3-6, Lisboa, Portugal (2009).

S. Vinga, K. Thomaseth, J. M. Lemos, A. R. Neves, H. Santos & A. T. Freitas. **Structural analysis of metabolic networks: a case study on *Lactococcus lactis*.** Proceedings of the 8th Portuguese Conference on Automatic Control (CONTROLO'2008). July, 21-23, Vila Real, Portugal (2008).

Book Chapters

P. Gaspar, A. R. Neves, H. Santos, P. F. de Palencia, C. Pelaez, T. Requena. **Engineering and re-routing of the metabolism of lactic acid bacteria.** Pp. 265-289. B. Mayo, P. López & G. Pérez-Martínez, Editors. Molecular Aspects of Lactic Acid Bacteria for Traditional and New Applications. Research Signpost, Kerala (2008).

A. R. Neves, A. Ramos & H. Santos. **Mannitol production by a genetically modified *Lactococcus lactis* strain studied by ¹³C-NMR *in situ*.** Pp. 75-81. G. A. Webb, P. S. Belton, A. M. Gil & I. Delgadilho, Editors. The Royal Society of Chemistry, Cambridge (2001).

Articles in Journals for a Broad Audience

A. Ramos, A. R. Neves, J. S. Almeida & H. Santos. **Ressonância Magnética Nuclear: uma técnica não-invasiva para observar em tempo real metabolitos em células vivas.** *Química*, **77**, 8-16 (2000).

Newsletters

A. R. Neves. **Metabolic Engineering of Lactic Acid Bacteria at ITQB.** ITQB, Biology Division Newsletter (2004).

SCIENTIFIC COMMUNICATIONS

Oral Presentations (Invitation/Selection)

Improved properties and products by metabolic engineering of *Lactococcus lactis*. A. R. Neves. Department of Biochemical Engineering. National University of Busan. September 22, 2012, Busan (South Korea).

Engineering *Lactococcus lactis* for reduced compounds production. A. R. Neves. IBS2012. September 16-21, 2012, Daegu (South Korea).

Improved properties and products by metabolic engineering of *Lactococcus lactis*. A. R. Neves. Symposium on Bio-based Production of Organic Acids. May 10-11, 2012, Frankfurt (Germany).

Engineering the cheese bacterium, *Lactococcus lactis*, for food and health. A. R. Neves. The Novo Nordisk Foundation Center for Biosustainability at DTU, December 7, 2011, Hørsholm (Denmark).

Engineering sugar metabolism in *Lactococcus lactis*: guidelines from *in vivo* NMR. A. R. Neves. Science and Technology Lecture Series. Chr. Hansen, December 6, 2011, Hørsholm (Denmark).

The sweet secrets of Gram-positive bacteria: lessons from *in vivo* NMR. A. R. Neves. AIMMS Lecture, Vrije Universiteit Amsterdam, October 20, 2011, Amsterdam (The Netherlands).

Disclosing the metabolism of host-derived sugars in *Streptococcus pneumoniae*. A. R. Neves. Department of Microbiology. University of Wageningen. October 19, 2011, Wageningen (The Netherlands).

Engineering *Lactococcus lactis* for food and health. A. R. Neves. SIM2011. July 24-28, 2011. New Orleans (USA).

The good guy and the bad guy: how different can they be? A. R. Neves. Departmental Lecture Series. University of Leicester. July 19, 2011, Leicester (UK).

A sweet twist in *Streptococcaceae*: ways that sugar metabolism shape virulence and metabolic traits. A. R. Neves. Centro de Biomedicina Molecular e Estrutural. Faculdade de Ciências e Tecnologia. Universidade do Algarve. March 31, 2011, Faro (Portugal).

A sweet twist in *Streptococcaceae*: ways that sugar metabolism shape virulence and metabolic traits. A. R. Neves. Center for Systems Microbiology. Department of Systems Biology. Technical University of Denmark. March 25, 2011, Lyngby (Denmark).

A sweet twist in *Streptococcaceae*: ways that sugar metabolism shape virulence and metabolic traits. A. R. Neves. SCAN at ITQB, March 9, 2011, Oeiras (Portugal).

Sugar metabolism in dairy and pathogenic *Streptococcaceae*: guidelines provided by *in vivo* NMR. A. R. Neves. CBAA seminar. Instituto Superior de Agronomia. December 9, Lisbon (Portugal).

Sugar metabolism in dairy and pathogenic *Streptococcaceae*. A. R. Neves. Pneumococcal sugar metabolism meeting. November 19-20, 2009, Siena (Italy).

Sugar metabolism in *Streptococcaceae*: guidelines provided by *in vivo* NMR. A. R. Neves. IPLA. October 29, 2009, Villaviciosa (Spain).

Probing sugar metabolism in Gram-positive bacteria using *in vivo* NMR. A. R. Neves. Departmental Lecture Series. University of Leicester. September 29, 2009, Leicester (UK).

Probing sugar metabolism in lactic acid bacteria using NMR. A. R. Neves. Cell-wall maintenance and sugar metabolism in Gram-positive bacteria - International Seminar Programme. University Medical Center Groningen (UMCG). University of Groningen. September 5, 2008, Groningen (The Netherlands).

Dynamics of intracellular metabolite pools in low-GC Gram-positives by NMR: guidelines for food and health. A. R. Neves. Lecture Series. Groningen Biomolecular Sciences and Biotechnology Institute, University of Groningen. June 20, Groningen (The Netherlands).

Dynamics of intracellular metabolite pools in Lactic Acid Bacteria by NMR: guidelines for food and health. A. R. Neves. Distinguished Lecture Series. Integrated BioSystems Institute, GeorgiaTech. April 11, Atlanta (USA).

Probing sugar metabolism non-invasively by NMR in *Streptococcus pneumoniae*. S. Carvalho, R. Castro, O. Kuipers, H. Santos & A. R. Neves. 8th European Meeting on the Molecular Biology of the Pneumococcus. April 14-17, 2007, Oeiras (Portugal).

Engenharia metabólica de bactérias lácticas. A. R. Neves. Encontro com os Laboratórios Associados, Ciência em Portugal – Ciência 2007, Fundação Calouste Gulbenkian, April 12-13, 2007, Lisboa (Portugal).

Engineering sugar metabolism in *Lactococcus lactis* for quality improvement of dairy foods: guidelines provided by NMR. A. R. Neves & H. Santos. 2nd International Symposium on Lactic Acid Bacteria. First Argentinian LAB Net Meeting. October 11-13, 2006, San Miguel de Tucumán (Argentina).

***In vivo* NMR techniques to study the dynamics of the intracellular metabolite pools in *Lactococcus lactis*.** A. R. Neves & H. Santos. 6th International Conference on Molecular Systems Biology. July 31 - August 4, 2006, LMU Biozentrum, Munich (Germany).

Applications of *in vivo* NMR to study sugar metabolism and its regulation in lactic acid bacteria (LAB). A. R. Neves. Invitation by Herminia de Lencastre, Molecular Genetics Group at ITQB. April 28, 2006, Oeiras (Portugal).

Metabolic engineering of *Lactococcus lactis*: guidelines provided by *in vivo* NMR. A. R. Neves. 25^o Ciclo de Conferências do Departamento de Química da Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa. October 12, 2005, Costa da Caparica (Portugal).

Projects involving proteomics in the Cell Physiology and NMR Lab at ITQB. A. R. Neves, N. Borges, P. Gaspar & H. Santos. 2nd Annual Meeting of Portuguese Proteomic Network - ProCura. November 29, 2004, Lisbon (Portugal).

Metabolic engineering of *Lactococcus lactis*: guidelines provided by NMR. A. R. Neves. SCAN at ITQB, October 29, 2004, Oeiras (Portugal).

Engineering sugar metabolism in lactic acid bacteria for quality enhancement of fermented foods: guidelines provided by *in vivo* NMR. A. R. Neves, W. A. Pool, J. Kok, O. Kuipers & H. Santos. Micro'2003, November 29 - December 2, 2003, Tomar (Portugal).

***In vivo* NMR studies of *Lactococcus lactis*: regulation of sugar metabolism and role of the redox charge.** A. R. Neves. Congresso Nacional de Microbiologia - MICRO2001, December 4-9, 2001, Póvoa do Varzim (Portugal).

Metabolic characterization of *Lactococcus lactis* deficient in lactate dehydrogenase using *in vivo* ¹³C-NMR. A. R. Neves, A. Ramos, C. Shearman, M. J. Gasson & H. Santos. The Fifth International Conference on Applications of Magnetic Resonance in Food Science, September 18-20, 2000, Aveiro (Portugal).

Glucose metabolism by genetically engineered *Lactococcus lactis* strains as monitored by *in vivo* NMR. A. R. Neves, A. Ramos & H. Santos. ITQB Ph.D. program, December 13, 1997, Oeiras (Portugal).

Oral Presentations in Project Meetings

Optimization of experimental conditions for *in vivo* NMR analysis of *C. glutamicum* ATCC13032. A. R. Neves, C. P. Almeida, L. L. Fonseca & H. Santos. BioProChemBB ERA-IB meeting, October 18-19, 2009, Berlin (Germany).

Dynamics of intracellular metabolite pools in Lactic Acid Bacteria by NMR: guidelines for food and health. A. R. Neves, P. Gaspar & H. Santos. DynaMo meeting, July 7, 2008, Oeiras (Portugal).

Metabolic manipulation of *Lactococcus lactis* for *in-situ* production of mannitol in dairy foods. P. Gaspar, A. R. Neves, M. J. Gasson, C. A. Shearman & H. Santos. DynaMo meeting, November 29, 2007, Oeiras (Portugal).

Inactivation of proteins in uptake pathways: effects on the metabolism of glucose in *Lactococcus lactis*. A. R. Neves, W. A. Pool, R. Castro, L. L. Fonseca, O. P. Kuipers, J. Kok & H. Santos. DynaMo meeting, June 7, 2007, Oeiras (Portugal).

Development of a biochemical model for citrate/glucose co-metabolism. C. Lara-Sanchéz, A. R. Neves, J. Cavalheiro, P. López & H. Santos. DECARBOXYLATE meeting, October 9-10, 2004, Copenhagen (Denmark).

Engineering sugar metabolism in *Lactococcus lactis*. A. R. Neves, W. A. Pool, J. Kok, O. P. Kuipers & H. Santos. NUTRACELLS meeting, December 16, 2004, Wageningen (The Netherlands).

Characterization of the novel *Lactococcus lactis* α -PGM. A. R. Neves, W. A. Pool, J. Kok, O. P. Kuipers & H. Santos. NUTRACELLS meeting, August 27-28, 2004, Groningen (The Netherlands).

Identification and cloning of a gene encoding for the key enzyme α -PGM in *Lactococcus lactis*. A. R. Neves, W. A. Pool, J. Kok, O. P. Kuipers & H. Santos. NUTRACELLS meeting, January 24-25, 2004, La Clusaz (France).

Improving galactose utilization by metabolic engineering in *Lactococcus lactis*. A. R. Neves, W. A. Pool, J. Kok, O. P. Kuipers & H. Santos. NUTRACELLS meeting, January 25-26, 2003, Funchal (Portugal).

Efficient conversion of sugars to low calorie sweeteners: trehalose and mannitol. F. Cardoso, P. Gaspar, J. Hugenholtz, A. R. Neves, A. Ramos & H. Santos. NUTRACELLS meeting, July 2, 2001, Cork (Ireland).

Metabolic engineering of *Lactococcus lactis*: NMR studies of glycolysis and exopolysaccharides production. A. R. Neves, A. Ramos, M. Kleerebezem, J. Hugenholtz, W. M. de Vos, & H. Santos. BIOTECH STARLAB meeting, March 15-16, 1999, Athis-Mons (France).

Other Oral Presentations

Bactérias do ácido láctico. A. R. Neves. Instituto de Tecnologia Química e Biológica – Highschool “Sebastião e Silva” class visit to the laboratory of Physiology of LAB & in vivo NMR. May 18, 2009, Oeiras (Portugal).

Bactérias do ácido láctico no dia a dia. A. R. Neves. Instituto de Tecnologia Química e Biológica – Highschool “Fernando Lopes Graça” class visit to the laboratory of Physiology of LAB & in vivo NMR. May 5, 2007, Oeiras (Portugal).

Bactérias do ácido láctico: amigos e perigos. A. R. Neves. Instituto de Tecnologia Química e Biológica – Highschool “Colégio de São Bernardes” class visit to the laboratory of Physiology of LAB & in vivo NMR. February 9, 2006, Oeiras (Portugal).

E se eu fosse uma bactéria do ácido láctico. A. R. Neves. Open day 2006. Instituto de Tecnologia Química e Biológica. January 28, 2006, Oeiras (Portugal).

Poster Presentations (recent from over 60 poster presentations)

Modulation of the kinetic properties of the major glucose transporter in *Lactococcus lactis*. P. Gaspar, R. Castro, W. Pool, O. P. Kuipers, J. Kok & A. R. Neves. LAB10, 10th Symposium on Lactic Acid Bacteria. August 28 - September 1, 2011, Egmond aan Zee (The Netherlands).

NAD⁺ cofactor recycling in *Lactococcus lactis* for production of reduced chemicals: 2,3-butanediol and mannitol. P. Gaspar, A. R. Neves, M. J. Gasson, C. A. Shearman & H. Santos. LAB10, 10th Symposium on Lactic Acid Bacteria. August 28 - September 1, 2011, Egmond aan Zee (The Netherlands). Oral flash-poster presentation by P. Gaspar.

Presence of the Lcn972-bacteriocin plasmid pBL1 impairs cellobiose uptake in *Lactococcus lactis*. B. Martínez, A. B. Campelo, P. Gaspar, C. Roces, A. Rodríguez, J. Kok, O. P. Kuipers & A. R. Neves. LAB10, 10th Symposium on Lactic Acid Bacteria. August 28 - September 1, 2011, Egmond aan Zee (The Netherlands).

Adaptation of a cryptic cel operon accounts for the appearance of lactose-utilizing *Lactococcus lactis* MG1363. A. Solopova, H. Bachmann, B. Teusink, J. Kok, A. R. Neves & O. P. Kuipers. LAB10, 10th Symposium on Lactic Acid Bacteria. August 28 - September 1, 2011, Egmond aan Zee (The Netherlands).

Dynamic modeling of pneumococcal growth: comparison between glucose and galactose metabolism of wild type and mutant strains. S. Vinga, S. M. Carvalho & A. R.

Neves. ICSB 2011, The 12th International Conference on Systems Biology, August 28 - September 1, 2011, Heidelberg/Mannheim (Germany).

Towards unraveling the catabolic pathways during growth on mucin-derived sugars. L. Paixão H. Yesilkaya, R. Sequeira, P. W. Andrew & A. R. Neves. EuroPneumo 2011, June 23-26, 2011, Amsterdam (The Netherlands). Oral communication by L. Paixão.

Unraveling the link between pyrimidine metabolism and capsule production in *Streptococcus pneumoniae*. S. M. Carvalho, T. G. Kloosterman, O. P. Kuipers & A. R. Neves. EuroPneumo 2011, June 23-26, 2011, Amsterdam (The Netherlands).

CcpA ensures optimal metabolic fitness of *Streptococcus pneumoniae* D39. S. M. Carvalho, T. G. Kloosterman, O. P. Kuipers & A. R. Neves. EuroPneumo 2011, June 23-26, 2011, Amsterdam (The Netherlands). Oral communication by S. M. Carvalho.

Metabolic and transcriptomic response to inactivation of the global regulator CcpA in *Streptococcus pneumoniae* D39. S. M. Carvalho, T. G. Kloosterman, O. P. Kuipers & A. R. Neves. ASM General Meeting 2011, May 21-24, 2011, New Orleans (USA).

Pneumococcal catabolic pathways during growth on glycan-derived sugars. L. Paixão H. Yesilkaya, P. W. Andrew & A. R. Neves. Analysis and Engineering of Biomolecular Systems, FEBS Advanced Lecture Course, September 11-17, 2010, Spetses (Greece).

Global approaches to study the impact of CcpA on sugar metabolism in *Streptococcus pneumoniae* D39. S. Carvalho, T. Kloosterman, O. P. Kuipers & A. R. Neves. Molecular Genetics of Bacteria & Phages August 24-28, 2010, Cold Spring Harbor, NY (USA). Oral communication by S. Carvalho.

In vivo metabolite profiling of *Lactococcus lactis* mutants towards the optimal production of reduced compounds. P. Gaspar, A. R. Neves, M. J. Gasson, C. A. Shearman & H. Santos. Metabolomics 2010. June 27 - July 1, 2010, Amsterdam (The Netherlands). Oral communication by P. Gaspar.

Towards improved galactose utilization in *Lactococcus lactis*. A. R. Neves, W. A. Pool, A. Solopova, J. Kok, H. Santos, O. P. Kuipers. Metabolic Engineering VIII: Metabolic Engineering for Green Growth. June 13-18, 2010, Jeju (South Korea).

Regulon of the global catabolite control protein CcpA in *Streptococcus pneumoniae*. S. Carvalho, T. Kloosterman, O. P. Kuipers & A. R. Neves. 9th European Meeting on the Molecular Biology of the Pneumococcus. June 4-7, 2009, Bern (Switzerland). Oral communication by S. Carvalho.

Engineering *Lactococcus lactis* for the production of trehalose, a strategy to improve acid stress resistance. A. L. Carvalho, F. Cardoso, R. Neves, R. Larsen, O. P. Kuipers, A. R. Neves & H. Santos. FEMS 2009. June 28 - July 2, 2009, Gothenburg (Sweden).

Strategies to improve mannitol production in *Lactococcus lactis*. P. Gaspar, A. R. Neves, M. J. Gasson, C. A. Shearman & H. Santos. FEMS 2009. June 28 - July 2, 2009, Gothenburg (Sweden).

Effect of inactivating components of glucose uptake pathways on the glycolytic dynamics of *Lactococcus lactis*. A. R. Neves, W. A. Pool, R. Castro, L. L. Fonseca, O. P. Kuipers, H. Santos & J. Kok. LAB9, 9th Symposium on Lactic Acid Bacteria. Health, Evolution and Systems Biology. August 31 - September 4, 2008, Egmond aan Zee (The Netherlands).

The last piece in the puzzle of glucose uptake by *Lactococcus lactis*: characterization of the individual transport systems. R. Castro, A. R. Neves, J. Kok, O. Kuipers & H. Santos. LAB9, 9th Symposium on Lactic Acid Bacteria. Health, Evolution and Systems Biology. August 31 - September 4, 2008, Egmond aan Zee (The Netherlands).

Carbohydrate metabolism in *Bifidobacterium breve* UCC 2003. K. Pokusaeva, A. Zomer, M. O'Connell-Motherway, P. Curley, A. R. Neves, G. F. Fitzgerald, D. van Sinderen. LAB9, 9th Symposium on Lactic Acid Bacteria. Health, Evolution and Systems Biology. August 31 - September 4, 2008, Egmond aan Zee (The Netherlands).

Metabolic characterization of *Streptococcus pneumoniae* D39 and its unencapsulated derivative R6. S. Carvalho, R. Castro, O. P. Kuipers, H. Santos & A. R. Neves. ISPPD-6, 6th International Symposium on Pneumococci & Pneumococcal Diseases, June 8 -12, 2008, Reykjavik (Iceland).

Mechanisms underlying induction of *cpsA* in a *spxB* mutant. J. Bijlsma, S. Carvalho, A. R. Neves & O. P. Kuipers. ISPPD-6, 6th International Symposium on Pneumococci & Pneumococcal Diseases, June 8 -12, 2008, Reykjavik (Iceland).

Functional characterisation of pneumococcal pyruvate formate lyases. H. Yesilkaya, F. Spissu, S. Carvalho, A. R. Neves & P. W. Andrew. ISPPD-6, 6th International Symposium on Pneumococci & Pneumococcal Diseases, June 8 -12, 2008, Reykjavik (Iceland).

***In vivo* ¹³C-NMR to unravel L-arabinose metabolism in yeasts.** C. Fonseca, A. R. Neves, A. M. M. Antunes, J. P. Noronha, B. Hahn-Hägerdal, H. Santos & I. Spencer-Martins. National Congresses of Microbiology, Biotechnology and Genetics – MICRO BIOTEC XXXIIIJPG 2007. November 30 - December 2, 2007, Lisboa (Portugal).

TEACHING AND SUPERVISION

TEACHING ACTIVITY

Undergraduate Courses

- 2008 Guest Lecturer; Lesson: **Trends on Metabolic Engineering of *Lactococcus lactis*.** Fermentation and Enzymology Course for undergraduates in Microbiology, Universidade Católica Portuguesa (Portugal).
- 2007 Guest Lecturer; Lesson: **Metabolic Engineering of *Lactococcus lactis*.** Fermentation and Enzymology Course for undergraduates in Microbiology, Universidade Católica Portuguesa (Portugal).
- 2005 **Co-coordination** of the Metabolic Engineering Course for undergraduates in Cell and Molecular Biology, Universidade Nova de Lisboa (Portugal).
Lessons: "Metabolic Networks and Integration of Metabolism", "Bacterial Metabolism: fermentation and respiration", "Metabolic Engineering of *Lactococcus lactis*: data from *in vivo* NMR and transcriptomics" and "Examples of microbial metabolic engineering".
Practicals: "*In vivo* NMR- metabolism of glucose in *L. lactis*".

Graduate Courses

- 2011 – **Coordinator** of the **Free Option Unit** (4 ECTS) of the ITQB Ph.D. Programme.
- 2011 **System biology approaches for strain optimization.** Tutorial within the Trends in Microbial and Cell Biology Module, ITQB Ph.D. Program. Instituto de Tecnologia Química e Biológica (Portugal).
- 2011 **Metabolic Networks and Integration of Metabolism.** Lesson within the Trends in Microbial and Cell Biology Module, ITQB Ph.D. Program. Instituto de Tecnologia Química e Biológica (Portugal).
- 2010 **System biology approaches for strain optimization.** Tutorial within the Trends in Microbial and Cell Biology Module, ITQB Ph.D. Program. Instituto de Tecnologia Química e Biológica (Portugal).
- 2010 **Metabolic Networks and Integration of Metabolism.** Lesson within the Trends in Microbial and Cell Biology Module, ITQB Ph.D. Program. Instituto de Tecnologia Química e Biológica (Portugal).
- 2008 **Metabolic Networks and Integration of Metabolism.** Lesson within the Microbial Physiology and Pathogenesis Module, ITQB Ph.D. Program. Instituto de Tecnologia Química e Biológica (Portugal).
- 2008 **Co-coordination** of the course Metabolic Engineering within the Master in Biotechnology, Universidade Nova de Lisboa (Portugal).

- Lessons: "Metabolic Networks and Fermentation", "Metabolic Engineering – Molecular Biology Tools", "Metabolic Engineering - Transcriptomics" and "Use of *in vivo* NMR to study sugar metabolism in *Lactococcus lactis*".
 Planning and supervision of the practical projects: "Cloning and overexpressing the lactate dehydrogenase gene in *Lactococcus lactis*" and "Effect of mannitol-1P dehydrogenase and phosphatase on the production of mannitol and the glycolytic flux in *Lactococcus lactis*".
- 2007 **Metabolic Networks and Integration of Metabolism.** Lesson within the Microbial Physiology and Pathogenesis Module, ITQB Ph.D. Program. Instituto de Tecnologia Química e Biológica (Portugal).
- 2006 **Planning** (with Karina Xavier, ITQB) of the course "Physiology and Biochemistry of Prokaryotes" within the Master program "Functional Architecture of Biological Systems (FABS): from genes to cells, to organisms, to systems" at Instituto de Tecnologia Química e Biológica (Portugal).
- 2005 **Genetic engineering of lactic acid bacteria.** Lesson within the Microbiology Module, Ph.D. Program in Experimental Biology and Biomedicine, Faculdade de Ciência Faculdade de Ciências e Tecnologia da Universidade de Coimbra (Portugal).
- 2004 **Coordination** of the "Proteomics Master Class – training course on 2D-gel electrophoresis". Instituto de Tecnologia Química e Biológica (Portugal).
- 2004 **Lactic acid bacteria. Physiology, old and new applications.** Lesson within the Microbiology Module, Ph.D. Program in Experimental Biology and Biomedicine, Faculdade de Ciências e Tecnologia da Universidade de Coimbra (Portugal).
- 2002 **Lactic acid bacteria. Physiology and applications.** Microbiology Module, Advanced Biochemical Engineering Course/Master in Biochemistry, Faculdade de Ciências e Tecnologia da Universidade de Coimbra (Portugal).
- 1999 **How does *Lactococcus lactis* react when missing a key-enzyme, lactate dehydrogenase?** Biotechnology Post-Graduation Course, Instituto de Tecnologia Química e Biológica (Portugal).

SUPERVISION EXPERIENCE

Supervision of Trainees

- 2006 - 2007 Vânia Fernandes.
Subject: Engineering *Lactococcus lactis* for the synthesis of trehalose: an approach to enhance acid stress resistance. Co-supervisor.

Supervision of Graduate Students

- 2011 – Pres. Anabela Vieira.
Subject: Design of *Lactococcus lactis* strains optimized for the production of endogenous polyphenols precursors. Principal Supervisor.
- 2011 – Pres. Joana Oliveira.
Subject: Effect of mucin-derived sugars on the physiology of *Streptococcus pneumoniae*. Principal Supervisor.
- 2010 – Pres. Ricardo Sequeira.
Subject: Quenching and extraction procedures for metabolite profiling *Streptococcus pneumoniae*. Principal Supervisor.
- 2010 - 2011 Teresa Ferreira.
Subject: Effect of environmental conditions on growth of *Staphylococcus aureus*. Co-supervisor.
- 2010 – Pres. Mafalda Cavaleiro.

- Subject:** Molecular characterization of glucose uptake routes in *Streptococcus pneumoniae*. Principal Supervisor.
- 2009 – 2011 Dusica Rados.
Subject: Metabolic characterization of *Corynebacterium glutamicum* strains engineered for the production of high value dicarboxylic and amino acids. Co-supervisor.
- 2009 - 2010 Ana Manso.
Subject: In vivo NMR studies of glucose metabolism in *Staphylococcus aureus*. Co-supervisor.
- 2007 – 2009 Laura Paixão.
Subject: Re-routing carbon flux to the production of mannitol in *Lactococcus lactis*. Co-supervisor.
- 2006 - 2007 Sandra Carvalho.
Subject: Investigation on the link between central carbon metabolism and capsule production in the human pathogen *Streptococcus pneumoniae*. Principal Supervisor.
- 2005 - 2007 Ana Lúcia Carvalho.
Subject: Metabolic strategies to improve acid tolerance in *Lactococcus lactis*: the role of trehalose. Co-supervisor.
- 2005 - 2006 Catarina Silva.
Subject: Engineering *Lactococcus lactis* for the production of mannitol: Characterization of *Lactococcus lactis* lactate dehydrogenases. Co-supervisor.
- 2004 Rui Neves.
Subject: Enzymes involved in the biosynthesis of trehalose in *Lactococcus lactis*. Co-supervisor.

Supervision of Master Students

- 2011 – Pres. João Jorge.
Master thesis: Bioengineering of *Lactococcus lactis* through modulation of its major glucose transporter. Principal Supervisor.
- 2008 – 2010 Teresa Maio.
Master thesis: A metabolomic approach to assess the effect of environmental factors and mutations on capsule production by *Streptococcus pneumoniae*. Principal Supervisor.

Supervision of Ph.D. Students

- 2011 – Pres Dusica Rados.
Ph. D. Thesis: Metabolic Engineering of *Corynebacterium glutamicum* for the production of four-carbon polyols under biotransformation conditions. Co-supervisor.
- 2009 – Pres. Laura Paixão.
Ph.D. thesis: Role of sugar sources in *Streptococcus pneumoniae* colonization of the nasopharynx. Principal Supervisor.
- 2008 – 2010 Nuno Tenazinha.
Ph.D. thesis: Integrated modeling of metabolic and gene regulatory networks. Co-supervisor.
- 2007 - Pres. Sandra Carvalho.
Ph.D. thesis: Novel insights into the molecular mechanisms underlying catabolic control and their relation to capsule production in *Streptococcus pneumoniae*. Principal Supervisor.
- 2007 - 2012 Ana Lúcia Carvalho.

Ph.D. thesis: A systems biology approach towards the development of Lactic Acid Bacteria with improved resistance to acid stress. Co-supervisor.

2005 - 2009 Rute de Ameida Ferreira de Castro.

Ph.D. thesis: Sugar metabolism in *Lactococcus lactis*: Glucose transporters and a novel α -phosphoglucomutase. Co-supervisor.

Supervision of Post-docs

2012 – Pres. Rafael Costa.

Subject: A metabolic network modelling and systems analysis of *Streptococcus pneumoniae* central metabolism in colonization and invasive disease. Co-supervisor.

2011 – Pres. Paula Gaspar.

Subject: Engineering *Lactococcus lactis* as a platform for the production of nutraceutical plant-derived polyphenols. Principal Supervisor.

2011 - 2011 Miguel Oliveira.

Subject: *Corynebacterium glutamicum* as a bioplatfrom for the production of succinate. Co-supervisor.

2008 - 2011 Paula Gaspar.

Subject: An integrative study to unveil regulatory mechanisms underlying sugar metabolism in the probiotic Bifidobacteria. Principal Supervisor.

Supervision of Students in Collaborative Projects

2012

Alessandro Bidossi

Ph.D. at University of Siena (Siena, Italy). Supervisor: Marco Oggioni.

Subject: Functional characterization of galactose transport systems in *Streptococcus pneumoniae*. Duration: three month visit.

2011-2012

Irene Gonzalez Rodriguez

Ph.D. at IPLA (Villaviciosa, Spain). Supervisor: Abelardo Margolles.

Subject: Elucidating the metabolism of lactose in *Bifidobacterium animalis* using NMR techniques. Duration: three + one month visit.

2010

Ana Belén.

Researcher at IPLA (Villaviciosa, Spain). Supervisor: Beatriz Martinez.

Subject: The link between bacteriocin production and sugar metabolism. Duration: six weeks visit.

2009-2010

Przemyslaw Nogly.

Ph.D. student at ITQB, Portugal. Supervisor: Margarida Archer.

Subject: Cloning and expression of his-tagged streptococcal sugar transporters. Duration: ongoing project.

2008

Karina Kopusaeva.

Ph.D. student at University College Cork, Ireland. Supervisor: Douwe van Sinderen.

Subject: Characterization of a novel ribokinase: identification of the phosphorylated product and determination of kinetic properties using NMR. Duration: seven weeks visit.

2008

Przemyslaw Nogly.

Research student at ITQB, Portugal. Supervisor: Margarida Archer.

Subject: Cloning and expression of his-tagged α -PGM in *Lactococcus lactis*. Duration: six weeks visit.

2008

Francesca Spissu.

Graduate student at University of Leicester, UK. Supervisors: Peter Andrew and Hasan Yesilkaya.

Subject: Identification of pyruvate-formate lyase genes in *Streptococcus pneumoniae*. Duration: three weeks visit.

General Supervision in Research Tasks

- 2006 César Fonseca.
Ph.D. student at CREM/FCT, Universidade Nova de Lisboa, Portugal. Supervisor: Isabel Spencer-Martins.
Subject: Characterization of L-arabinose metabolism in yeast by *in vivo* NMR.
Duration: nine months.
- 2004 - 2005 João Cavalheiro.
EU Research assistant at ITQB, Portugal. Supervisor: Helena Santos.
Subject: Effect of pH on the growth of *Lactococcus lactis*.
- 2003 - 2006 Claudia Sanchéz.
EU Post-doctoral fellow at ITQB, Portugal. Supervisor: Helena Santos.
Subject: Characterization of glucose and citrate metabolism in *Lactococcus lactis* strains using *in vivo* NMR.
- 2002 - 2008 Wietske Pool.
Ph.D. student at Dept. Molecular Genetics, RUG, The Netherlands. Supervisors: Jan Kok and Oscar P. Kuipers.
Subject: Engineering of sugar metabolism in *Lactococcus lactis*.
- 2002 - 2008 Paula Gaspar.
Ph.D. student at ITQB, Portugal. Supervisor: Helena Santos.
Subject: Metabolic engineering of *Lactococcus lactis* for mannitol production - the role of NADH-dependent dehydrogenases in directing carbon fluxes.
- 2001 - 2002 Pedro Coelho.
Trainee at ITQB, Portugal. Supervisor: Helena Santos.
Subject: Study of central metabolism in genetically engineered *Lactococcus lactis* strains: purification and characterization of a lactate dehydrogenase with low affinity for NADH.

THESIS COMMITTEES

- 2008 - Pres. Mafalda Henriques.
Ph.D. thesis: Assembly of the *Streptococcus pneumoniae* capsular polysaccharide at the growing bacterial cell wall.
Instituto de Tecnologia Química e Biológica, Universidade Nova de Lisboa (ITQB/UNL), Oeiras, Portugal.
Supervisor: Sérgio R. Filipe (ITQB, Portugal).
- 2008 - 2009 Gautam Goel.
Ph.D. thesis: System identification from biological time-series data.
Bioengineering Graduate Program, Wallace H. Coulter Dept. of Biomedical Engineering, Georgia Institute of Technology, Atlanta, Georgia (USA).
Supervisor: Eberhard O. Voit (Georgia Institute of Technology, USA).

THESIS EVALUATION COMMITTEES

- 2012 Petri-Jaan Lahtvee.
Ph.D. thesis: Absolute omics-level analysis of growth rate dependent energy metabolism in *Lactococcus lactis*.
Tallin University of Technology.
Supervisor: Raivo Vilu (Tallin U. Technology, Estonia).
- 2012 Sulman Shafeeq.
Ph.D. thesis: Impact of varying metal ion- and carbohydrate concentrations on gene expression in the human pathogen *Streptococcus pneumoniae*.
University of Gronigen.
Supervisor: Oscar P. Kuipers (U. Groningen, The Netherlands).

- 2011 Ana Bárbara Malta da Costa Lapa.
Master thesis: A participação dos genes *mreB* e *spi* no processo autolítico de *Listeria monocytogenes*. Mestrado em Ciências Biomédicas. Faculdade de Ciências e Tecnologia. Universidade do Algarve, Faro (Portugal).
Supervisor: Leonor Faleiro (U. Algarve, Portugal).
- 2009 Gautam Goel.
Ph.D. thesis: System identification from biological time-series data. Bioengineering Graduate Program, Wallace H. Coulter Dept. of Biomedical Engineering, Georgia Institute of Technology, Atlanta, Georgia (USA).
Supervisor: Eberhard O. Voit (Georgia Institute of Technology, USA).
- 2008 Paula Cristina Trindade Lima Gaspar.
Ph.D. thesis: Metabolic engineering of *Lactococcus lactis* for mannitol production - the role of NADH-dependent dehydrogenases in directing carbon fluxes. Instituto de Tecnologia Química e Biológica, Universidade Nova de Lisboa (ITQB/UNL), Oeiras, Portugal. Supervisor: Helena Santos (ITQB, Portugal).
- 2005 Jorge Gutiérrez Merino.
Ph.D. thesis: Caracterización inmunoquímica de la enterocina P y evaluación de su clonación, producción y expresión funcional en *Escherichia coli*, *Methylobacterium extorquens*, *Lactococcus lactis* y *Pichia pastoris*. Facultad de Veterinaria, Universidad Complutense de Madrid, Madrid (Spain).
Supervisors: Pablo E. Hernández Cruza and Luis M. Cintas Izarra (Univ. Complutense de Madrid, Spain).

PAPER REVIEWING

- 2005 – pres. Reviewer for several indexed journals including Molecular Microbiology, Journal of Bacteriology, PLoS ONE, Microbial Biotechnology, Journal of Molecular Microbiology and Biotechnology, Applied and Environmental Microbiology, Applied Microbiology and Biotechnology, Electronic Journal of Biotechnology, International Journal of Microbiology, Journal of the Science of Food and Agriculture, Journal of Agricultural and Food Chemistry, etc.
- 2003 - 2007 Assisted Helena Santos in reviewing several scientific papers.

ADMINISTRATIVE POSTS

- 2011 – Pres. Member of the organizing and scientific commission of the ITQB Ph.D. Programme.
- 2010 – Pres. Floor Deputy.
- 2008 – Pres. Member of the Think Tank 2nd Cycle Committee for evaluating and planning a 2nd cycle program at ITQB.
- 2006 – 2010 Floor Coordinator, member of the Infrastructures Committee at ITQB.
- 2005 Member of the Analytical Services Evaluation Committee.
- 2005 – 2006 Consultive member of Open Day at ITQB Organizing Committee (January 2006).
- 2004 – 2005 Member of the Open Day at ITQB Organizing Committee (January 2005).

SCIENTIFIC ACTIVITY SPREADING ACTIONS

- 2006 – Pres. Devised hands-on activities for groups of highschool children (10th to 12th grade) accompanied by science teachers who visited my laboratory.

- 2007 **Alimentos funcionais**, Metro Portugal, October 27, 2007. Text by Suely Costa based on an interview with Ana Rute Neves.
- 2004 - 2005 **ITQB Open Day**, January 29, 2005. Member of the Organizing Committee. Head of the team representing the Biology Division of ITQB. The Biology Division exhibition entitled "The Microbe World" aimed at bringing the microbiological research carried out in ITQB closer to the society. Also responsible for the stands "Science for children" and "Dark zone - a bioluminescence exhibition".
- 2004 - 2005 Member of the Organizing Committee ITQB-CMO Drawing Contest under the theme "**If I was a scientist**". Over 250 drawings were evaluated and 15 little artists invited to spend a day at ITQB.
- 2004 Member of the Organizing Committee for the event "**Science in the Park**". This event took place during the Oeiras county festivities week and was directed to families with children. Exhibitions included the "see what you eat - yoghurt bacteria in action", "the bugs that ferment bread", "DNA extraction from fruits", etc.
- 1999 - 2001 Participation in several initiatives within the Programa Ciência Viva/Semana da Ciência e Tecnologia (Foundation for Science and Technology, Portugal), which were mainly directed towards school children and teenagers and aimed at showing the ongoing research projects at Instituto de Tecnologia Química e Biológica.

AWARDS AND GRANTS

- 2001 - 2003 Post-doctoral fellowship (SFRH/BPD/7120/2001). Fundação para a Ciência e a Tecnologia, Portugal.
- 1998 Gulbenkian Science Prize, 1998. Fundação Calouste Gulbenkian, Portugal.
- 1997 - 2001 Doctoral fellowship (BD/9022/96), Programa PRAXIS XXI, Fundação para a Ciência e a Tecnologia, Portugal.
- 1995 - 1996 Young Researcher Grant, Junta Nacional de Investigação Científica e Tecnológica (JNICT), Portugal.

AFFILIATION IN SCIENTIFIC SOCIETIES

Sociedade Portuguesa de Bioquímica.
American Society for Microbiology.

POST GRADUATION COURSES

Laboratory Management Course for Independent Scientists. Metis Leadership/EMBO, November 18-20, 2007, Ericeira (Portugal).

Systems Biology - From Molecules to Cells. FEBS Advanced Lecture Course, March 12-18, 2005, Gosau (Austria).

Advanced Technologies for Metabolic Engineering in Biotechnology and Medicine. FEBS Advanced Course, September 7-13, 2002, Carcavelos (Portugal).

Functional and Comparative Genomics. The Gulbenkian Training Program in Bioinformatics, Instituto Gulbenkian de Ciência, November 27-30, 2001, Oeiras (Portugal).

Biotechnology Post-Graduation Courses at ITQB, Instituto de Tecnologia Química e Biológica, June 28 - July 9, 1999, Oeiras (Portugal).

Chemistry Post-Graduation Courses at ITQB, Instituto de Tecnologia Química e Biológica, December 11-18, 1998, Oeiras (Portugal).

Metabolic Engineering: Methods, Logic and Opportunities, Massachusetts Institute of Technology (MIT), August 18 -22, 1997, Boston (USA).

LANGUAGES

Portuguese (mother tongue), English and Spanish (fluent, written and spoken), French (basic) and Danish (rudimentary).