

Isabel Alexandra Aguiar de Abreu Ph. D.

ACADEMIC QUALIFICATIONS

- 20 Sept 1996 **Degree in Biochemistry** by Faculdade de Ciências, Universidade de Lisboa.
- 16 Dec 2002 **Ph.D. in Biochemistry** at Instituto de Tecnologia Química e Biológica, Universidade Nova de Lisboa.
Mentor: Prof. Miguel Teixeira
Thesis: *Mechanisms for oxidative stress response in anaerobic prokaryotes – rubredoxin:superoxide oxidoreductase, a new pathway for superoxide detoxification.*

RESEARCH PATH

- Presently at **Investigadora Auxiliar (Auxiliary Researcher) at GPlantS Unit, Instituto de Biologia Experimental e Tecnológica (iBET)/Instituto de Tecnologia Química e Biológica (ITQB), Oeiras, Portugal**
Project leader. Biochemistry. Post-translational modifications. Plant abiotic stress.
GPlantS Unit Leader: Prof. Margarida Oliveira.
- 2009-2012 **Investigadora Auxiliar (Research Associate) at Molecular Structure, Instituto de Biologia Molecular e Celular, Porto, Portugal**
Post-translational modifications - SUMOylation.
Group Leader: Dr. Sandra Ribeiro.
- 2007-2009 **Postdoctoral Researcher at Laboratory of Plant Genetic Engineering, Instituto de Tecnologia Química e Biológica, Oeiras, Portugal.**
Coordinator of biochemistry of abiotic stress plant response.
Group Leader: Prof. Margarida Oliveira.
- 2005-2007 **Postdoctoral Fellow at Rockefeller University, Laboratory of Plant Molecular Biology, NY, USA.**
Post-translational modifications of proteins by SUMO, in *Arabidopsis thaliana*. "SUMOproteomics".
Supervisor: Prof. Nam-Hai Chua.
- 2003-2005 **Research Associate at Brookhaven National Laboratory, NY, USA.**
(2005) Biochemistry.

Supervisor: Dr. John Shanklin.

(2003-2005) Fast kinetics and theoretical calculations (DFT) on SODs.

Supervisor: Dr. Diane Cabelli.

- 2000-2001 **Technical Collaborator at Brookhaven National Laboratory, NY, USA.**
Pulse-radiolysis studies in Superoxide Dismutase and Superoxide Reductase Enzymes.
- 1996-2002 **Ph.D. Student, at Instituto de Tecnologia Química e Biológica, Oeiras, Portugal.**
Involved in the discovery and initial characterization of a new type of enzymes involved in superoxide elimination – Superoxide Reductases.
Mentor: Prof. Miguel Teixeira.
- 1995-1996 **Undergraduate student, at Instituto de Tecnologia Química e Biológica, Oeiras, Portugal.**
Supervisor: Prof. Dr. Miguel Teixeira.
Study of sulfur metabolism in *Desulfovibrio desulfuricans* (ATCC 27774).

MANAGEMENT FUNCTIONS

- Presently **ITQB Users' Director of Mass Spectrometry Unit (UniMS)**
UniMS is the ITQB and iBET Mass Spectrometry Unit guaranteeing analysis to the research community and to industry:
<http://www.itqb.unl.pt/facilities/UniMS-Mass-Spec-Services>
- Presently PI at ITQB for RNEM (Portuguese Network for Mass Spectrometry)

FUNDING AND PROJECT MANAGEMENT

Ongoing Grants:

- 2014-2017 Portuguese Coordinator and PI of European Project Plant-KBBE DELLA-STRESS (P-KBBE/0001/2012) - Control of abiotic stress responses by the plant DELLAs and chemicals stabilizing these repressors. March, 1 2014-February 28 2015. European Coordination of Claus Schwechheimer (TUM, Germany): 150K.
- 2012-2016 Scientific-coordinator of WP6 in European Project - KBBE.2011.3.1-01 (3to4): Converting C3 to C4 photosynthesis for sustainable agriculture. Collaborative project funded by EU FP7. 1st January 2012 to 31st December 2016. Coordinator: Richard C. Leegood (Univ. Sheffield,UK): 294K.
- 2013-2014 Scientist in GENOSUBER: Sequencing the Cork Oak genome.
- 2012-2015 WP coordinator/Team Member (15%) – “An integrated approach to identify

stress-related regulatory genes in cork oak (SuberStress)". PTDC/AGR-GPL/118505/2010: 27K.

2013-2015 Team Member (15%) – “*SUMOdulator - Researching SUMO modulation of plant abiotic stress responses*”. PTDC/BIA-PLA/3850/2012: 5K.

Past Grants:

2010-2013 PI with coordination of manganese-superoxide dismutase tasks (30%) – “*Oxidative stress response mechanisms in Deinococcus radiodurans*”. PTDC/QUI-BIQ/100007/2008: 88K.

COLLABORATIONS WITH INDUSTRY FOR TECHNOLOGY TRANSFER

Ongoing COPSEMAR, Spain - Within Project DELLA-STRESS (P-KBBE/0001/2012)

2009-2013 BASF Plant Science

PEER REVIEWED SCIENTIFIC PUBLICATIONS

Scopus Bibliometrics on May 21, 2014

(References #19; #24 and #26 still not available for bibliometrics, on this date)

Papers found: **23**

Total citations: **493**

(without self-citations: 460)

Citing Articles: **392**

h-index: **13**

Publications:

2014

26. Pereira-Leal JB, **Abreu IA** *et al.* comprehensive assessment of the transcriptome of cork oak (*Quercus suber*) through EST sequencing (2014) BMC Genomics. 15:371.

IF2012=4.4,

25. Sheng Y, **Abreu IA***, Cabelli DE, Maroney MJ, Miller A-F, Teixeira M, Valentine JS (2014) Superoxide Dismutases and Superoxide Reductases. Chem. Rev. 114:3854-918.

IF2012=41.3, Times cited: 4

***corresponding author**

24. Marques AT, Santos SP, Rosa MG, Rodrigues MAA, **Abreu IA**, Frazão C, Romão CV (2014) Expression, purification and crystallization of MnSOD from *Arabidopsis thaliana*. *Acta Cryst.* (2014). F70, 669–672.

IF2012=0.552

2013

23. **Abreu IA**, Farinha AP, Negrão S, Gonçalves N, Fonseca C, Rodrigues M, Batista R, Saibo NJM, Oliveira MM. (2013) Coping with abiotic stress: Proteome changes for crop improvement. *J Prot*, 93:145-168.

IF2012=4.1, Times cited: 2

22. Pires IS, Negrão S, Pentony MM, **Abreu IA**, Oliveira MM, Purugganan MD. (2013) Different evolutionary histories of two cation/proton exchanger gene families in plants. *BMC Plant Biol.* 4;13:97.

IF2012=4.4

21. Almeida B, Fernandes S, **Abreu IA**, Macedo-Ribeiro S. (2013) Trinucleotide repeats: a structural perspective. *Front Neurol.* 20;4:76.

IF2012=n/a

20. Lourenço T, Sapeta H, Figueiredo DD, Rodrigues M, Cordeiro A, **Abreu IA**, Saibo NJ, Oliveira MM. (2013) Isolation and characterization of rice (*Oryza sativa* L.) E3-ubiquitin ligase OsHOS1 gene in the modulation of cold stress response. *Plant Mol Biol.* <http://dx.doi.org/10.1007/s11103-013-0092-6>.

IF2012=3.5, Times cited: 2

19. Sá-Moura B, Simões AM, Fraga J, Fernandes H, **Abreu IA**, Botelho HM, Gomes CM, Marques AJ, Dohmen RJ, Ramos PC, Macedo-Ribeiro S (2013) Biochemical and biophysical characterization of recombinant yeast proteasome maturation factor ump1. *Comput Struct Biotechnol J.* doi: 10.5936/csbj.201304006. eCollection 2013.

18. Serra TS, Figueiredo DD, Cordeiro AM, Almeida DM, Lourenço T, **Abreu IA**, Sebastián A, Fernandes L, Contreras-Moreira B, Oliveira MM, Saibo NJ. (2013) OsRMC, a negative regulator of salt stress response in rice, is regulated by two AP2/ERF transcription factors. *Plant Mol Biol.* 82(4-5):439-55.

IF2012=3.5, Times cited: 4

17. Negrão S, Almadanim MC, Pires IS, **Abreu IA**, Maroco J, Courtois B, Gregorio G, McNally K and Oliveira MM (2013) New allelic variants found in key rice salt-tolerance genes: an association study. *Plant Biotechnol. J.*, 11(1):87-100.

IF=6.3, Times cited: 7

2012

16. Carvalho SD, Saraiva R, Maia TM, **Abreu IA**, Duque P (2012) XBAT35, a novel *Arabidopsis* RING E3 ligase exhibiting dual targeting of its splice isoforms, is involved in ethylene-mediated regulation of apical hook curvature. *Mol. Plant*, 25:1295.

IF=6.1, Times cited: 6

2011

15. Negrão S, Courtois B, Ahmadi N, **Abreu I**, Saibo N, Oliveira MM (2011) Recent updates on salinity stress in rice: from physiological to molecular responses. *Critical Reviews in Plant Science* 30: 329-377.

IF=4.7, Times cited: 15

2010

14. **Abreu IA** and Cabelli DE (2010) Superoxide Dismutases – A Review of the Metal-Associated Mechanistic Variations. *Invited Review at Biochim. Biophys. Acta – Proteins & Proteomics*, 1804:263-74.

IF=2.8, Times cited: 60

2008

13. **Abreu IA**, An H, Hearn A, Nick HS, Silverman DN, Cabelli DE. (2008) The kinetic mechanism of manganese-containing superoxide dismutase from *Deinococcus radiodurans*: a specialized enzyme for the elimination of high superoxide concentrations. *Biochemistry*, 47:2350-2356.

IF=3.4, Times cited: 16

2007

12. Catala R, Ouyang J, **Abreu IA**, Hu Y, Seo H, Zhang X, Chua N-H. (2007) The Arabidopsis E3 Sumo ligase Siz1 regulates plant development and drought responses. *Plant Cell* 19:2952-2966.

IF=9.7, Times cited: 99

11. Rodrigues JV, Saraiva LM, **Abreu IA**, Teixeira M, Cabelli DE (2007) Superoxide Reduction by *Archaeoglobus fulgidus* Desulfoferrodoxin. Comparison with Neelaredoxin. *J. Biol. Inorg. Chem.* 12:248-256.

IF=3.3, Times cited: 22

2006

10. Guy J, **Abreu IA**, Moche M, Lindqvist Y, Whittle E, Shanklin J (2006) A single mutation in the castor D9-18:0-desaturase changes partitioning between reaction chemistries, from desaturation to oxidase chemistry. *Proc. Nat. Acad. Sci.* 103:17220-4

IF=9.6, Times cited: 18

9. Rodrigues JV, **Abreu IA**, Cabelli DE, Teixeira M (2006) Superoxide reduction mechanism of *Archaeoglobus fulgidus* one-iron superoxide reductase. *Biochem.* 45:9266-9278.

IF=3.6, Times cited: 29

2005

8. **Abreu IA**, Rodriguez JA, Cabelli. DE (2005) Theoretical studies of manganese and iron superoxide dismutases: superoxide binding and superoxide oxidation. *J. Phys. Chem. B.* 109:24502-24509.

IF=4.0, Times cited: 15

7. Rodrigues JV, **Abreu IA**, Saraiva LM, Teixeira M (2005) Rubredoxin acts as an electron donor for Neelaredoxin in *Archeoglobus fulgidus*. *Biochem. Biophys. Res. Comm.* 329:1300–1305.

IF=3.0, Times cited: 20

6. Rodriguez JA, **Abreu IA** (2005) Chemical activity of iron in [2Fe-2S]-protein centers and FeS₂(100) surfaces. *J. Phys. Chem. B.* 109:2754-2762.

IF=4.0, Times cited: 10

2003

5. **Abreu IA**, Lourenço A, Pacheco I, Xavier AV, LeGall J, Coelho A, Matias P, Carrondo MA, Teixeira M, Saraiva LM (2003) Novel metal centre in the split-soret cytochrome from *Desulfovibrio desulfuricans* (ATCC 27774). *J. Biol. Inorg. Chem.* 8:360-370.

IF=3.9, Times cited: 10

2002

4. **Abreu IA**, Xavier AV, LeGall J, Cabelli DE, Teixeira M (2002) Superoxide scavenging by neelaredoxin: dismutation and reduction activities in anaerobes. Review article. *J. Biol. Inorg. Chem.* 7:668-674.

IF=3.9, Times cited: 25

2001

3. **Abreu IA**, Saraiva LM, Soares CM, Teixeira M, Cabelli DE (2001) The mechanism of superoxide scavenging by *Archaeoglobus fulgidus* neelaredoxin, *J. Biol. Chem.* 276: 38995-39001.

IF=7.3, Times cited: 40

2000

2. **Abreu IA**, Saraiva LM, Carita J, Huber H, Stetter KO, Cabelli DE, Teixeira M (2000) Oxygen detoxification in the strict anaerobic archaeon *Archaeoglobus fulgidus*: superoxide scavenging by Neelaredoxin, *Mol. Microbiol.*, 38: 322-334.

IF=6.3, Times cited: 54

1996

1. Pereira IAC, **Abreu IA**, Xavier AV, LeGall J, Teixeira M (1996) Nitrite reductase from *Desulfovibrio desulfuricans* (ATCC 27774) - a heterooligomer heme protein with sulfite reductase activity, *Biochem. Biophys. Res. Comm.* 224: 611-618.

IF=3.0, Times cited: 35

In proceedings

1. **Abreu IA**, Saraiva LM, Soares CM, Cabelli D, Teixeira M. (2001) A site-directed mutagenesis study to assess the mechanism of superoxide scavenging by *Archaeoglobus fulgidus* Neelaredoxin. *J. Inorg. Biochem.* 86:119-119 (Abstract in proceedings)

Related References – commenting the above publications

Walsh, K.M., Following Nature's Lead - Scientists seek better Catalysts. *Discover Brookhaven*, Winter 2006, pp.: 10-13.

Evans, J., Enzyme complex exposed to oxidation - Novel Fe–S structure allows the development of more efficient catalysts. *Chemistry World*. Vol 2, no. 3, March 2005.

Walsh, K.M., Nature leads way to better catalysts – Iron-sulfur nanosystem isolated from bacterium is predicted to be more reactive than catalysts in use. *The Bulletin BNL*, Vol 59, no. 7, March 4 2005.

UNIVERSITY AND POST-GRADUATION LEVEL TEACHING

| | |
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| 2008 | Coordination and teaching: Course on “Biotecnologia Vegetal”, Universidade Católica Portuguesa – Extensão da Escola Superior de Biotecnologia nas Caldas da Rainha, for Microbiology finalist students. |
| 2010 | Instructor: Advanced Workshop BioPlant - The Ins and Outs of the Plant Cell: “ROS in plant cells” and “Regulation of cell proteome by posttranslational modifications – SUMOylation in response to abiotic stress”. Faculdade de Ciências da Universidade da Porto, |
| 2009 | Instructor: PhD Program at Instituto Gulbenkian de Ciência - “Plant Models” |
| 2009 | Instructor: Advanced Workshop within European Project - Adonis: “Instructor: Advanced Workshop BioPlant - The Ins and Outs of the Plant Cell: “ROS in plant cells” at Instituto de Tecnologia Química e Biológica, Oeiras. |

STUDENT SUPERVISION

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| Presently | Supervisor of Post-Doctoral Fellow Bruno Alexandre, at GPlantS, at ITQB, Portugal: Proteomics under European Project 3to4 and FCT grant (SFRH/BPD/98619/2013). |
| | Supervisor of 2 nd -year PhD student Ana Margarida Rosa, at GPlantS, at ITQB, Oeiras, Portugal – “ <i>SUMO conjugating enzymes in abiotic stress response in rice</i> ” (SFRH/BD/84219/2012). |
| | Supervisor of 2 nd -year PhD student Mafalda Rodrigues, at GPlantS, at ITQB, Oeiras, Portugal – “ <i>A fast way to induce drought-response: SUMOylation-based strategies in Arabidopsis</i> ” (SFRH/BD/87420/2012). |

Supervisor of 2nd-year PhD student Nuno Gonçalves, at GPlantS, at ITQB, Oeiras, Portugal – “*Insights into rice response to abiotic stress: The role and regulation of the only DELLA protein of rice*” (SFRH/BD/85799/2012).

Co-Supervisor of 4th-year PhD student Cecília Pina, at GPlantS, at ITQB, Oeiras, Portugal – “*Functional characterization of the abiotic stress-related rice gene OsCPK17 through physiologic, genomic and proteomic approaches*” (SFRH/BD/61121/2009).

Co-Supervisor of 3rd-year PhD student André Cordeiro, at GPlantS, at ITQB, Oeiras, Portugal – “*Transcriptional regulation of the rice OsDREB1B in response to abiotic and biotic stresses*” (SFRH/BD/74946/2010).

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| 2012-2014 | Co-Supervisor of Post-Doctoral Fellow Alexandra Marques, at GPlantS, ITQB, Portugal: x-ray structural aspects of Arabidopsis MnSOD (SFRH/BPD/68866/2010). |
| 2010-2011 | Supervisor of the Master Student (Instituto Superior Técnico) Mafalda Rodrigues at GPlantS, ITQB, Oeiras, Portugal – “ <i>SUMOylation Role in Proteome Regulation during Plant Dehydration-Stress Response - Establishment of a Gel-Based Proteomics Protocol</i> ” |
| 2008 | Coordinator of two undergraduate students at Laboratório de Engenharia Genética de Plantas, at ITQB. |
| 2003-2004 | Coordinator of two Summer undergraduate students’ at Brookhaven National Laboratory, NY, USA, under the supervision of Dr. Diane Cabelli. |
| 2001 | Authorship and teaching/coordination of the vocational training course for life sciences’ high-school teachers in “Cellular Respiration” (50 hour course) |
| 1998-2003 | Coordination of undergraduate students in Grupo de Bioenergética e Metaloproteínas, Instituto de Tecnologia Química e Biológica, under the supervision of Prof. Dr. Miguel Teixeira. |

ORGANIZING COMMITTEES

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| 2009 | Local Organizing Committee Member for PlantGEM8, Lisbon, Portugal. |
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JURY COMMITTEES

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| 2014 | Opponent at Ph.D. Thesis discussion “Interaction between class III peroxidase sans arabinogalactan proteins in plant cell physiology” by Sara Bettercourt |
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Saraiva Alves Ramos, at Universidade do Porto, Portugal.

- 2013 **Opponent** at Ph.D. Thesis discussion “Functional Analysis of the SUMO conjugation/deconjugation system during the development and stress response of *Arabidopsis thaliana*” by Pedro Humberto A. R. F. Castro, at Universidade do Minho, Portugal.
- 2011 **Opponent** at Master Thesis discussion “Uncovering the role of ULP1c and ULP1d proteases in plant development and the drought stress response” by Daniel N. S. Couto, at Universidade do Porto, Portugal.
- 2011 **Jury Member as Supervisor** at “*SUMOylation Role in Proteome Regulation during Plant Dehydration-Stress Response - Establishment of a Gel-Based Proteomics Protocol*” by Mafalda Rodrigues, at Instituto Superior Técnico.
- 2011 **Jury Member** at PhD thesis discussion “Mitosis and Protein N-alfa-Terminal Acetylation” by Ana R. Marques, at ITQB, Universidade Nova de Lisboa.
- 2004 **Scientific Jury** at the 2004 9th annual ROHM AND HAAS ELECTRONIC MATERIALS invitational science fair for High-School students, *April 25, 2004 - Herricks High School, New Hyde Park, NY, USA.*
- 2003 **Scientific Jury** at the 8th annual Shipley Invitational Science Fair for High-School students, *April 6, 2003 - South Side High School, Rockville, NY, USA.*

“SCIENCE AND SOCIETY” EVENTS

- 2008 Chairwoman in Plant Genetic Engineering IV - Student Seminar Cycle, in Sciences Faculty, Lisbon University - “IV Mini-Jornadas de Engenharia Genética”, Departamento de Biologia Vegetal, Faculdade de Ciências da Universidade de Lisboa.
- 2003 Seminar: “Why do fireflies glow?” and Stand organization (“Do all gases weight the same?”), during Brookhaven National Laboratory’s Society Open Day.
- 2001-2002 Work with the Portuguese Agency for Scientific Culture (Ciência Viva), namely authorship and presentation of “Free radicals and Antioxidants” in the symposium “Kitchen is a Laboratory”, in the 6^o Forum Ciência Viva.
- 2001 Authorship and teaching/coordination of the vocational training course for life sciences’ high-school teachers in “Cellular Respiration” (50 hour course)

FELLOWSHIPS AND AWARDS

- 2005-2009 **Post-Doctoral Fellowship** from Fundação para a Ciência e Tecnologia, Portuguese Government.
- 1997-2001 **Ph.D. Fellowship** from PRAXIS XXI/96, Fundação para a Ciência e Tecnologia, Portuguese Government.

- 1997-1998 **Honorary Member of SBIC** (*Society of Biological Inorganic Chemistry*) – Poster Prize awarded at EUROBIC3 (*3rd European Conference on Bio-inorganic Chemistry*).
- 1995-1996 **Under-Graduate Fellowship** from PRODEP, Portuguese Government.

2014 TEAM POSTER COMMUNICATIONS AT SCIENTIFIC MEETINGS, REGARDING CURRENT LINE OF RESEARCH

1. Gonçalves NM, Oliveira MM, Abreu IA (2014) The role and regulation of the only DELLA protein of rice in abiotic stress. Plant Biology Europe FESPB/EPSO Congress 2014, Dublin, Ireland, 22nd-26th June.
2. Rodrigues MA, Oliveira MM, Abreu IA (2014) Drought-Stress Fundamentals: A Proteomic Approach to Compare the Arabidopsis Responses to Three Distinct Drought-Stress Induction Methods. Plant Biology Europe FESPB/EPSO Congress 2014, Dublin, Ireland, 22nd-26th June.
3. Alexandre BM, Farinha AP, Oliveira MM, Saibo NJM, Abreu IA (2014) Identification of New Phosphorylation Sites in Key C4 Maize Enzymes - A Proteomics Approach. Plant Biology Europe FESPB/EPSO Congress 2014, Dublin, Ireland, 22nd-26th June.
4. Alexandre BM, Farinha AP, Luís I, Oliveira MM, Saibo NJM, Abreu IA (2014) Identification of New Phosphorylation Sites in Key Maize C4 Enzymes. Gordon Conference on CO₂ Assimilation in Plants: Genome to Biome. 2014, WaterVille Valey, NH, USA, 8th-14th June.

2013/2014 TEAM ORAL COMMUNICATIONS AT SCIENTIFIC MEETINGS, REGARDING CURRENT LINE OF RESEARCH

1. Abreu I.A. (2014) SUMOylation in Plant Drought Stress: Who is regulating the regulator?. Plant Biology Europe FESPB/EPSO Congress 2014, Dublin, 26th June.
2. Farinha AP, Alexandre B, Abreu IA (2013) Post-translational modifications - *Converting C3 to C4 photosynthesis for sustainable agriculture*. 3to4 Meeting, Champagne, IL, USA, 6th August.
3. Almadanim MC, Negrão S, Abreu IA, Oliveira MM (2013) Uncovering OsCPK17 role in rice abiotic stress response. FV2013, Lisboa, Portugal, 27th July.
4. Rosa AM, Rodrigues MAA, Oliveira MM, Romão CV, Abreu IA (2013) Role of manganese superoxide dismutase in Arabidopsis stress and development. FV2013, Lisboa, Portugal, 24th July.
5. Miranda C, Rodrigues MAA, Rosa AM, Abreu IA, Romao CM (2013) Study of manganese levels in *Deinococcus radiodurans*. Metallomics 2013, 4th International Symposium on Metallomics, Oviedo, Spain, 8-11 July 2013.