

Rita Gil Vasconcelos Mota

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Rita Mota (RM) has a Degree, a Master and a PhD in Biology (2017) by the Faculty of Sciences, U. Porto (FCUP) (awarded best PhD thesis in Life Sciences FCUP 2017-2019). During the PhD, she spent several periods at U. Florence, Italy. RM is a Senior Researcher at acib GmbH - Austrian Centre of Industrial Biotechnology & BOKU-University of Natural Resources and Life Sciences, Austria. Previously, RM was a Junior Researcher at i3S (07/18-05/21) and was teaching from 2017 to 2022. RM published 23 articles in peer-reviewed journals (7 as 1st author & 2 as senior author), 3 book chapters (1 as 1st author) (citations 595, h-index 14, Scopus database 05/23) and is inventor in 1 USA filled patent and 2 international patent requests. RM was Guest Editor for 2 Special Issues (Marine Drugs & Life) and acts as reviewer for 13 journals. RM has secured constant R&D funding since 2016, as well as participated in 5 distinct entrepreneurship accelerating programs as team leader, gave 6 interviews for science dissemination, and received 9 innovation and merit awards/honours. RM research is mainly focused on cyanobacterial extracellular polymeric substances (EPS), including the study of their biosynthetic pathways, characterization of the polymers, and exploitation of possible biotechnological/biomedical applications for the polymers. RM main long-term goal is to develop sustainable and innovative cyanobacteria-based products/applications.

Work experience (last 5 years)

01/06/2022-Present Senior Researcher at acib GmbH - Austrian Centre of Industrial Biotechnology, Austria

01/06/2021-31/05/2022 Collaborator at i3S-Institute for Research & Innovation in Health / IBMC-Institute for Molecular & Cell Biology, University of Porto, Portugal

01/03/2021-31/07/2022 Invited Adjunct Professor of Genetic Engineering, ISEP-School of Engineering, Polytechnic of Porto

01/07/2018-31/05/2021 Junior Researcher, “Cyanobacterial extracellular polymeric substances (EPS): From the genes to the industrial toolbox” POCI-01-0145-FEDER-028779; i3S/IBMC

15/09/2017-17/06/2018 Invited Assistant Professor of Biophysics, ICBAS-Abel Salazar Institute of Biomedical Sciences, U. Porto

01/09-31/12/2017 Research Fellow, “CyanoSec - understanding Cyanobacterial Secretion, envisioning technological applications” (FCT: IF/00256/2015); i3S/IBMC

01/02-31/07/2017 Research Fellow, “Structured Programme on Bioengineering Therapies for Infectious Diseases and Tissue Regeneration”, Task “Synthesis and application of nanostructured biomaterials and biopolymers” (NORTE-01-0145-FEDER-000012); i3S/IBMC

01/02/2013-31/01/2017 PhD Fellow, FCT: SFRH/BD/84914/2012 (Biotechnology); IBMC (supervisor P. Tamagnini) & Department of Agrifood Production & Environmental Sciences, University of Florence, Italy (co-supervisor: R. De Philippis)

Education

2013-2017 PhD in Biology, “Cyanobacterial extracellular polymeric substances (EPS): biosynthesis, characteristics and applications”, Doctoral Program in Biology, FCUP-Faculty of Sciences, U. Porto | “Fundação Eng. António de Almeida” Prize for best PhD thesis from 2017-2019 in Life Sciences

2008-2010 Msc in Biology, FCUP; Thesis “Screening physiological/environmental conditions that influence the production of extracellular polymeric substances by *Cyanothece* sp. CCY 0110”, IBMC

2005-2008 Bsc in Biology, FCUP

Projects (last 5 years)

As PI:

1/03/2023-Present “CyanoCare: novel cyanobacterial polymer for skin care” acib GmbH & Astarte srl (210.000 €) - Project Leader

1/06/2022-Present “Marine cyanobacterial polymers as sustainable platforms for skin well-being” acib GmbH

(203.000 €) - Project Leader

1/10/2020-31/05/2022 “CyanoCare - development of products for skin protection and regeneration based on cyanobacteria”; Innovation Support Programme (PAI) “Health Valorization”, EIT Health Hub U. Porto (4.000 €); i3S & FMUP - Faculty of Medicine, Univ. Porto

01/02-31/12/2020 “CyanoCare- development of added-value products based on cyanobacteria”; BIP PROOF - Business Ignition Programme, U. Porto Inovação & Fundação Amadeu Dias (10.000 €); i3S

01/11/2016-30/11/2017 “AntiBioCoat - Anti-adhesive Biopolymer Coating”, RESOLVE 2016: Technology Transfer Ignition Program in the Health Sector, Portugal (Norte2020; 45.000 €); i3S

As Co-PI:

01/09/2018-31/12/2020 “AntiBioCoat - Anti-adhesive Biopolymer Coating”, CaixaImpulse 2018, la Caixa Foundation/EIT-Health (100.000 €); Obra Social la Caixa, Barcelona, Spain & i3S

As Team Member:

01/03/2019-28/02/2022 "Green rehabilitation system for burned soils based on the inoculation of native cyanobacteria and microalgae" (FCT: PCIF/RPG/0077/2017; 180.328 €); i3S & FCUP - Task Leader

01/07/2018-28/02/2021 “Cyanobacterial extracellular polymeric substances (EPS): From the genes to the industrial toolbox” (FCT: POCI-01-0145-FEDER-028779; 235.106 €); i3S/IBMC

Supervision

PhD student:

João Pissarra, “Exploring natural polymers: from the biosynthesis of cyanobacterial extracellular polymeric substances (EPS) to possible applications” (2020.08663.BD), Doctoral Program in Molecular and Cell Biology, ICBAS, (01/2021 - expected conclusion date 12/2024) - Supervisor.

MSc students:

Beatriz Cruz, “Cyanobacterial extracellular polymeric substances (EPS): production and evaluation of antitumor activity”, Master in Cell and Molecular Biology, FCUP (16/12/2021) - Co-supervisor.

Luís Costa, “Development of wound dressings based on cyanobacterial extracellular heteropolysaccharides”, Master in Bioengineering, ICBAS/FEUP (14/10/2019) - Supervisor.

Ana Catarina Monteiro, Ana Filipa Santos, Daniela Silva, Luís Costa, Rafaela Presa; “SkinSealer - From seabed to wound bed”, Molecular Bioengineering Project, Bidesign Innovation, and Economics & Management, Master in Bioengineering, ICBAS/FEUP (05/02/2019) - Mentor.

Jorge Matinha Cardoso, “Development of an anti-adhesive coating based on a heteropolymer produced by a marine bacterium: towards industrial production”, Master in Bioengineering ICBAS/FEUP (12/10/2018) - Supervisor.

BSc Thesis:

Francisco Esteves, “Isolation and characterization of cyanobacterial extracellular heteropolysaccharides aiming at the development of wound dressings and other applications”, Degree in Biochemistry, FCUP (07/09/2020) - Supervisor.

Publications

Last 5 years:

[23] **Mota R**, Lima RT, Flores C, Silva JF, Cruz B, Alves B, Pinto MT, Adessi A, Pereira SB, De Philippis R, Soares P, Tamagnini P. 2023. Assessing the antitumor potential of variants of the extracellular carbohydrate polymer from *Synechocystis* ΔsigF mutant. *Polymers* 15, 1382.

[22] Matinha-Cardoso J, Santos T, Pereira H, Varela J, Tamagnini P, **Mota R**. 2023. Pilot scale production of *Crocospaera chwakensis* CCY0110 and evaluation of its biomass nutritional potential. *Algal Res* 69, 102939.

[21] Rodrigues T, **Mota R**, Gales L, Campo-Deaño L. 2022. Understanding the complex rheology of human blood plasma. *J Rheol* 66, 761.

[20] Brito, Â, Rocha M, Kaštovský J, Vieira J, Vieira CP, Ramos V, Correia M, Santos M, **Mota R**, Roque J, Pissarra J, Melo P, Tamagnini P. 2022. A new cyanobacterial species with a protective effect on lettuce grown under salinity stress: Envisaging sustainable agriculture practices. *J Appl Phycol* 34:915-928.

[19] Matinha-Cardoso J, **Mota R**, Gomes LC, Gomes M, Mergulhão FJ, Tamagnini P, Martins MCL, Costa F. 2021. Surface activation of medical grade polyurethane for the covalent immobilization of an anti-adhesive biopolymeric coating. *J Mater Chem B*, 9:3705-3715.

[18] Costa R, Costa L, Rodrigues I, Meireles C, Soares R, Tamagnini P, **Mota R**. 2021. Biocompatibility of the Biopolymer Cyanoflan for Applications in Skin Wound Healing. *Mar Drugs*, 19, 147.

- [17] Costa B, **Mota R**, Tamagnini P, Martins MCL, Costa F. 2020. Natural Cyanobacterial Polymer-Based Coating as a Preventive Strategy to Avoid Catheter-Associated Urinary Tract Infections. *Mar Drugs*, 18, 279.
- [16] **Mota R**, Vidal R, Pandeirada C, Flores C, Adessi A, De Philippis R, Nunes C, Coimbra MA, Tamagnini P. 2020. Cyanoflan: a cyanobacterial sulfated carbohydrate polymer with emulsifying properties. *Carbohydr Polym*, 229:115525.
- [15] Costa B, **Mota R**, Parreira P, Tamagnini P, Martins MCL, Costa F. 2019. Broad-Spectrum Anti-Adhesive Coating Based on an Extracellular Polymer from a Marine Cyanobacterium. *Mar Drugs*, 17, 243.
- [14] **Mota R**, Alves M, Vieira CP, Vieira J, Tamagnini P, Saraiva A. 2019. Didymozoids in Muscle of Atlantic Chub Mackerel (*Scomber colias*). *Acta Parasitol*, 64:308-315.
- [13] Estevinho BN, **Mota R**, Leite JP, Tamagnini P, Gales L, Rocha F. 2019. Application of a cyanobacterial extracellular polymeric substance in the microencapsulation of vitamin B12. *Powder Technol*, 343:644-651.
- [12] Flores C, Santos M, Pereira SB, **Mota R**, Rossi F, De Philippis R, Couto N, Karunakaran E, Wright PC, Oliveira P, Tamagnini P. 2019. The alternative sigma factor SigF is a key player in the control of secretion mechanisms in *Synechocystis* sp. PCC 6803. *Environ Microbiol*, 21:343-359.
- [11] Pereira SB, Santos M, Leite JP, Flores C, Eisfeld C, Büttel Z, **Mota R**, Rossi F, De Philippis R, Gales L, Morais-Cabral JH, Tamagnini P. 2019. The role of the tyrosine kinase Wzc (Sll0923) and the phosphatase Wzb (Slr0328) in the production of extracellular polymeric substances (EPS) by *Synechocystis* PCC 6803. *MicrobiologyOpen*, e753.
- [10] Brito Â, Ramos V, **Mota R**, Lima S, Santos A, Vieira J, Vieira CP, Kaštovský J, Vasconcelos VM, Tamagnini P. 2017. Description of new genera and species of marine cyanobacteria from the Portuguese Atlantic coast. *Mol Phylogenet Evol*, 111:18-34.
- [9] Leite JP, **Mota R**, Durão J, Neves SC, Barrias CC, Tamagnini P, Gales L. 2017. Cyanobacterium-derived extracellular carbohydrate polymer for the controlled delivery of functional proteins. *Macromol Biosci*, 17:1600206.

Other publications:

- [8] **Mota R**, Rossi F, Andrenelli L, Pereira SB, De Philippis R, Tamagnini P. 2016. Released polysaccharides (RPS) from *Cyanothece* sp. CCY 0110 as biosorbent for heavy metals bioremediation: Interactions between metals and RPS binding sites. *Appl Microbiol Biotechnol*, 100:7765-7775.
- [7] Pereira SB, **Mota R**, Vieira C, Vieira J, Tamagnini P. 2015. Phylum-wide analysis of proteins putatively involved in the production of extracellular polymeric substances (EPS) by cyanobacteria. *Sci Rep*, 5:14835.
- [6] **Mota R**, Pereira SB, Meazzini M, Fernandes R, Santos A, Evans C, De Philippis R, Wright P, Tamagnini P. 2015. Differential proteomes of the cyanobacterium *Cyanothece* sp. CCY 0110 upon exposure to heavy metals. *Data in Brief*, 4:152-158.
- [5] **Mota R**, Pereira SB, Meazzini M, Fernandes R, Santos A, Evans C, De Philippis R, Wright P, Tamagnini P. 2015. Effects of heavy metals on *Cyanothece* sp. CCY 0110: growth, EPS production, ultrastructure and protein profiles. *J Proteom*, 120:75-94.
- [4] Oliveira P, Pinto F, Pacheco CC, **Mota R**, Tamagnini P. 2015. HesF, an exoprotein required for filament adhesion and aggregation in *Anabaena* sp. PCC 7120. *Environ Microbiol*, 17:1631-1648.
- [3] **Mota R**, Guimarães R, Büttel Z, Rossi F, Colica G, Silva CJ, Santos C, Gales L, Zille A, De Philippis R, Pereira S, Tamagnini P. 2013. Production and characterization of extracellular carbohydrate polymer from *Cyanothece* sp. CCY 0110. *Carbohydr Polym*, 92:1408-1415.
- [2] Hermida M, **Mota R**, Pacheco CC, Santos CL, Cruz C, Saraiva, Tamagnini P. 2012. Infection levels and diversity of anisakid nematodes in blackspot seabream, *Pagellus bogaraveo*, from Portuguese waters. *Parasitol Res*, 110:1919-1928.
- [1] Brito Â, Ramos V, Seabra R, Santos A, Santos CL, Lopo M, Ferreira S, Martins A, **Mota R**, Frazão B, Martins R, Vasconcelos V, Tamagnini P. 2012. Culture-dependent characterization of cyanobacterial diversity in the intertidal zones of the Portuguese coast: a polyphasic study. *Systematic and Applied Microbiology*, 35:110-119.

Book chapters:

- [3] Brito Â, **Mota R**, Pacheco CC, Tamagnini P. 2022. Cyanobacterial biofilms: Formation, distribution and applications. In *Expanding Horizon of Cyanobacterial Biology*, pp. 91-108. Eds. P. Singh, M. Fillat, V. Sittler & A. Kumar. Elsevier Ltd., Academic Press. Oxford, United Kingdom. <https://doi.org/10.1016/B978-0-323-91202-0.00004-X>
- [2] **Mota R**, Flores C, Tamagnini P. 2021. Cyanobacterial Extracellular Polymeric Substances (EPS). In *Polysaccharides of Microbial Origin*. pp. 139-165. Eds. J.M. Oliveira, H. Radhouani & R.L. Reis. Springer, Cham. https://doi.org/10.1007/978-3-030-35734-4_11-1
- [1] Pereira SB, **Mota R**, Santos CL, De Philippis R, Tamagnini P. 2013. Assembly and export of extracellular polymeric substances (EPS) in cyanobacteria: A phylogenomic approach. In *Advances in Botanical Research*:

Genomics of Cyanobacteria. 65, pp. 235-279. Eds. F. Chauvat & C. Cassier-Chauvat. Elsevier Ltd., Academic Press. Oxford, UK.

Invited oral communications

Oral presentations:

- CyanoCare: Cyanobacterial polymers for the cosmetic industry. Mota, R. 6º Encontro de Biotecnologia Microbiana e Farmacêutica, Portugal, 17/05/2022.
- Cyanoflan: a versatile cyanobacterial polymer for the cosmetic industry. AlgaEurope Conference 2021, 7-10/12/21 (online; Young Algaeneers Pitch session).
- Cyanobacterial extracellular polymers - From the genes to the industrial toolbox. V Encontro de Laboratório Universidade de Coimbra, 8-9/05/21 (online).
- Cyanobacterial extracellular polymeric substances to encapsulate drugs. XII Symposium on Bioengineering, Univ. Porto, 26-28/03/20 (online).
- CyanoCare - desenvolvimento de produtos de elevado valor acrescentado com base em cianobactérias marinhas. Economia do Mar, Ciclo de Eventos - Dinâmicas para a Inovação, Agência Nacional de Inovação (ANI), 8/07/20 (online).
- CyanoCare - cyanobacterial polymers for the cosmetic industry: from Biology to the Blue Biotechnology industry. V Jornadas de Bioengenharia da UTAD. 4-5/03/20, Vila Real, Portugal.
- Cultivation of Cyanobacteria. PhotoBioCat: Light-driven Sustainable Biocatalysis Training Network, Marie Skłodowska-Curie Actions: Innovative Training Networks-European Joint Doctorates. 10-14/02/20, Porto.

Lectures:

- Cyanobacteria as promising organisms for biotechnology. Curricular Unit of Molecular and Microbial Biology, Master in Bioresources, ISEP (29/10/21).
- Cyanobacterial extracellular polymers. Curricular Unit of Introduction to Bioresources, Degree in Bioresources, ISEP (25/03/21).
- Cyanobacteria as promising organisms for biotechnology. Curricular Unit of Genetic Engineering, Master in Biomedical Engineering, ISEP (04/05/20).

Patents

- US11458202B2: "Cyanobacterium extracellular polymer, compositions and uses thereof" (2022.10.04).
- WO/2019/171344A1: "Uses of cyanobacterium extracellular polymer, compositions, coated surfaces or articles" (2019.09.12).
- WO/2018/042378A1: "Cyanobacterium extracellular polymer, compositions and uses thereof" (2018.03.08).

Prizes and Distinctions

- 12/2020: Best Microalgae Awards 2020 Wild Card Category.
- 10/2020: "Fundação Eng. António de Almeida" Prize for best PhD thesis 2017-2019 in Life Sciences, FCUP (1500€)
- 07/2019: Semifinalist at Everis Portugal Awards 2019, Fundacio Everis, Spain.
- 05/2019: Honourable Mention in Innovation Category «O Melhor do Portugal Tecnológico», Exame Informática.
- 06/2018: 3rd Place in National Final of ClimateLaunchpad 2018, a Climate-KIC Programme from EIT.
- 04/2018: Best Innovation Project Award, 1st Edition, with AntiBioCoat Project (5 000€).
- 02/2018: Distinction Born From Knowledge - BfK AWARDS awarded by ANI - Agência Nacional de Inovação, within Splash! by Mermaid™ competition & Honourable Mention awarded by Mermaid Investments jury.
- 09/2017: i3S-Hovione Capital Health Innovation Prize: Partners Award, with AntiBioCoat Project.

Additional Training (last 5 years)

- 09/2021-01/2022 "CyanoCare", BlueInvest Readiness Assistance, Coaching Plan Cycle 08, European Union
- 04-07/2020: Volunteer in the realization of detection tests of the SARS-CoV-2 virus by RT-qPCR (i3S Task Force)
- 01-02/2020: PMP® - Project Management Professional from Project Management Institute
- 05-2019: Laboratory Animal Science Course, FELASA Category C - Functions A, B and D (Directive 2010/63/EU)
- 02-2019: Futures for Tomorrow Program, organized by Forum Oceano and Porto Business School
- 01-09/2019: Ideas Contest Platicemar: Consolidation Platform of TICE Sector & Entrepreneurship in Sea Economy
- 11-2018: MyBlueCity initiative integrated in the BioMarine Business Convention

05-11/2018: ClimateLaunchpad 2018, Climate-KIC Programme, EIT (European Inst. of Innovation & Technology)

03-06/2018: HiTech Program from Porto Business School (PBS)

02-07/2018: Voluntary Internship Programme in European Algae Biomass Association (EABA)

11/2017-02/2018: Escola de Startups do Parque de Ciência e Tecnologia da Univ. Porto (UPTEC), Portugal

Dissemination

Scientific Meetings:

11th European Workshop on the Biology of Cyanobacteria, 31/05-04/06/2020, Porto, Portugal - member of the local organizing committee.

III ABC-AEICBAS Biomedical Congress, 20-22/03/2015, Porto, Portugal - organization of a Biochemistry Workshop of Cyanobacteria (invited).

14th International Symposium on Phototrophic Prokaryotes, 05-10/08/2012, Porto, Portugal - member of the local organizing committee.

25 poster communications: 10 as first author in national (4) or international (6) meetings and 15 as co-author in national (3) or international (12) meetings.

Interviews:

Journal: Público (Bioengenharia) “Microalgas em vez de derivados de petróleo? Rita quer cosméticos mais sustentáveis” (2019) | Público (Biomedicina) “Dos ossos aos cateteres, projectos portugueses que atacam infecções conquistam apoio” (2018)

Online: Observador “O princípio do fim das infeções urinárias nos hospitais” (2021) | “Como acabar com as infeções hospitalares? Ela sabe” (2021) | Biomarine Community “CyanoCare - A green solution for greener businesses” (2019)

TV & Magazine: SIC Notícias e Revista Exame Informática “Investigadores portugueses desenvolvem cianobactérias que ajudam a reduzir infeções hospitalares” (2018)

Radio: Antena 1, Programa Ponto de Partida 76 “Os Micróbios Verdes” (2018)

Language skills

Portuguese, English and German (A1)