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Science Sessions 2021

Catarina Rosado and L. Monteiro Rodrigues, eds.

CBIOS Science Sessions 2021

SARS-CoV-2 is mutating, does it matter?

O SRA-CoV-2 está em mutação, será que isso importa?

Marta Alenquer

Instituto Gulbenkian Ciência
R. Qta. Grande 6, 2780-156 Oeiras, Portugal

22 January 2021

Abstract

Abstract not published at the lecturer's request

Lecturer's resumé

With a background in Biological Engineering, I have always been interested in understanding how human pathogens, viruses in particular, cause disease. For that reason, I did my PhD, between Faculdade de Medicina - Universidade de Lisboa and University of Cambridge, on the molecular pathogenesis of gammaherpesvirus latent infection. In November 2013, I joined the Maria João Amorim's lab, at Instituto Gulbenkian de Ciência, where I have been studying molecular mechanisms governing influenza A virus infection of host cells.

Since the beginning of the pandemics, I have refocused my work to help in the fight against COVID-19. Our group is involved in different projects aimed at better understanding and controlling SARS-CoV-2 outbreak. I will be talking about one of those projects..

Effect of TMBIM Family Members in Glioma

Efeito dos membros da família TMBIM no Glioma

Marta Martins

CBIOS Lusófona's Research Center for Biosciences and Health Technologies, Universidade Lusófona de Humanidades e Tecnologias
Av. Campo Grande 376, 1749-024 Lisbon, Portugal

12 February 2021

Abstract

The severity of gliomas is closely associated with their ability to spread and invade other tissues. Members of the TMBIM family of ion channels, can disturb cellular processes known to participate in the promotion of cancer. These include apoptosis resistance, promotion of cell invasion and changes in metabolic status. We hypothesize that these proteins impact Glioma progression.

Bioinformatics analysis performed by us indicates that the levels of various TMBIMs mRNAs are dysregulated in gliomas. Particularly, TMBIM4 mRNA is upregulated in low-grade gliomas (LGG) and glioblastoma (GB) when compared with normal tissues and increases with glioma grade. Laser dissected GB tissues confirmed the increased levels of TMBIM4. High levels of TMBIM4 are associated with a significant reduction in the survival of LGG patients (HR of 3.2) but not of GB patients.

Reduction in TMBIM4 expression induced by siRNA transfection provoked a strong inhibition of 2-D and 3-D U-87 cell invasion (~4 fold) without affecting cell viability. Cells with lower expression of TMBIM4 have a smaller size and an increased number of cell protrusions than control cells. Ongoing studies aim at evaluating the effect of hGAAP in glioma in vivo invasion and at dissecting the molecular mechanisms involved.

TMBIM4 is a promising putative marker for glioma progression and may constitute a novel druggable target to be explored for anti-cancer therapeutic strategies.

Lecturer's resumé

Marta Martins is a BSc in Biology from Lusófona University. As part of her Master degree in Oncobiology at the Faculty of Medicine, University of Lisbon she has been exploring the effect of the TMBIM family members in glioma progression at CBIOS under the supervision of Dr Nuno Saraiva at CBIOS (Research Centre for Biosciences & Health Technologies). Marta was awarded the best poster at the ASPIC/LPCC «Cancer Biology: From Basic to Translational Research» meeting (26 Sept 2020) for her work on Effect of TMBIM Family Members in Glioma; and a Short-Term Scientific Mission (STSM) grant from COST action EuroCellNet to conduct part of her research project at Dr Helene Castel group at Inserm U1239, Normandie Rouen University.

Influence of joint movement on lower limb perfusion and its relationship with biomechanical variables of plantar pressure and pressure center

Influência do movimento articular na perfusão do membro inferior e sua relação com variáveis biomecânicas de pressão plantar e centro de pressão

Sérgio Loureiro Nuno

CBIOS Lusófona's Research Center for Biosciences and Health Technologies, Av. Campo Grande 376, 1749-024 Lisbon, Portugal
ESTeSL-IPL Lisbon's Polytechnic Institute - School of Health Technology, Lisboa, Portugal
Clínica São João de Deus – CTD, Lisbon, Portugal

26 February 2021

Abstract

Microcirculatory physiology in the lower limb and mechanical function of the ankle are important areas of knowledge for a better understanding of the functional anatomy of this region. The alteration of the mechanical balance can condition the perfusion or, indirectly, result in a microcirculatory compromise.

From a clinical point of view, a multifactorial approach is necessary since, in normative or pathological cases, there are several factors of variability involved assuming that a microvasculature associated with the biomechanical component may have a main role.

Two protocols were applied - protocol 1 performing squats and protocol 2 adopting one-leg flexion. Each protocol consisted of 3 phases: phase 1 (5 minutes) - orthostatic position (baseline); phase 2 (2 minutes) the challenge phase; and phase 3 (5 minutes) - recovery (rest). Perfusion variations were assessed on both feet using laser-Doppler flowmetry (LDF) and polarization spectroscopy (TiVi). On the other hand, RSscan Footscan is a pressure-sensitive platform that assesses the distribution of plantar pressure based on the displacement of the center of pressure and the image of narcotic pressure.

The pressure relationship and the LDF and TiVi systems were analyzed. The foot was divided into 4 areas to check the relationship between pressure and microcirculation. In the case of the squat, (symmetrical movement on both sides) the information of the center of pressure, pressure of the quadrants of each foot and the position of greater flexion and extension of the knees were crossed in order to see the influences along the circulation activity time and its relationship with plantar pressure.

This study seeks to explore this clinical information and verify how the synchronized data from LDF, TiVi and pressure for future studies.

Lecturer's resumé

Degree in Physiotherapy at the School of Health of the Portuguese Red Cross (ESSCVP) with the award of a merit scholarship at the end of the course (2010). Master in Physiotherapy held at the School of Health Technologies of Lisbon - Polytechnic Institute of Lisbon (ESTeSL-IPL). PhD student in Health Sciences - Physiotherapy, at the ULHT (Lisbon) / University of Alcalá (Madrid).

Attended the Integrated Master's Degree in Medicine at the Faculty of Medical Sciences of the Universidade Nova de Lisboa with completion of several curricular units and several health courses with continuing education.

Professional activity, especially in the hospital context - Physiotherapy Coordinator at Clínica São João de Deus (since 2010) and in sports - Physiotherapist at the Rio 2016 Olympic Games; Consultant for the preparation of the Tokyo 2020/21 Olympic Games - Physiotherapy Area; World Rowing Championships and Europe; Physiotherapist and Coordinator at the Clube de Futebol "Os Belenenses" in futsal and handball.

Professor at the School of Health Technology of Lisbon - Polytechnic Institute of Lisbon (ESTeSL-IPL) since 2016.

Advisor of curricular internships.

Reviewer of scientific articles in the European Journal of Physiotherapy and in the journal Salutis Scientia.

Scientific interest mainly in the areas of microcirculation and biomechanics

Mechanisms of resistance to trastuzumab and pertuzumab in HER2-positive breast cancer: preliminary analysis of redox and immune-related biomarkers

Mecanismos de resistência ao trastuzumab e pertuzumab no cancro da mama HER2-positivo: análise preliminar de biomarcadores redox e imunológicos relacionados

Paulo Luz[1,2], Isabel Fernandes[3], Rocio D. Acedo[4], Joana Magalhães[1], Salvador G. Casado[5], Juan B. Cañada[5], Ana J. Arede[1], José E. Morera[1], Beatriz Gosalbez[1], José Catarino[6], João Gregório[2], Pedro Faísca[2,6], João G. Costa[2], Ana S. Fernandes[2]

[1]Centro Hospitalar Universitário do Algarve, Portugal; [2]CBIOS - Universidade Lusófona's Research Center for Biosciences & Health Technologies, Lisboa, Portugal, [3]Centro Hospitalar Barreiro – Montijo, Portugal, [4]Hospital Universitario Virgen de Valme, Sevilla, Spain, [5]Hospital Universitario Puerta del Mar, Cádiz, Spain, [6]Faculdade de Medicina Veterinária, Universidade Lusófona de Humanidades e Tecnologias, Lisboa, Portugal

12 March 2021

Abstract

Treatment of HER2+ breast cancer (BC) relies on neoadjuvant therapy (NAT) with dual HER2 blockade with trastuzumab and pertuzumab. Achieving pathological complete response (pCR) after NAT is correlated with improved survival [1], but treatment resistance remains a problem. Understanding the biology of the residual disease in cases of non-pCR, will allow to comprehend the mechanisms of resistance to anti-HER2 drugs. The presence of tumor-infiltrating lymphocytes (TILs) in the microenvironment has been pointed as a biomarker of response to NAT in HER2+ BC, as well as a prognostic marker of disease-free survival [2]. Redox alterations influence the immune microenvironment and have been suggested as a mechanism of resistance to anti-HER2 therapy [3].

Material & Methods: We retrospectively analyzed HER2+ BC patients from 4 hospitals in Portugal and Spain from January 2017 to December 2020. Patients submitted to NAT with double anti-HER2 block followed by surgery were included. The following parameters were analyzed: age at diagnosis, chemotherapy regimen, pathological response, adjuvant anti-HER2 treatment, disease-free survival and TILs in the biopsy. The surgical resected specimens are being analyzed for TILs (according to the recommendations of the International Immuno-Oncology Biomarker Working Group on BC) and for the biomarker of oxidative damage 4-hydroxynonenal (by immunohistochemistry).

Results: most of the patients included in our cohort achieved pCR. NAT with trastuzumab and pertuzumab was associated with a high pCR rate. Preliminary data show that HER2 BC expressed moderate to high scores of TILs with no significant changes between the biopsy and the surgical resected specimen.

Conclusions: The association of clinical information with the scores of TILs and oxidative damage in the residual disease will allow a better understanding of the mechanisms of anti-HER2 drugs resistance. Moreover, it will help to establish novel prognostic biomarkers useful to identify populations at higher risk of relapse.

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The authors have no conflicts of interest.

Lecturer's resumé

Medical oncology resident at Algarve University Hospital Centre; PhD student in Health Sciences at Universidad Alcalá de Henares (in partnership with CBIOS-Universidade Lusófona).

Deciphering the molecular mechanisms underlying polyphenols protection against diabetes: the case of ellagitannins

Decifrar os mecanismos moleculares subjacentes à protecção dos polifenóis contra a diabetes: o caso das elagitaninas

Regina Menezes

CBIOS Lusófona's Research Center for Biosciences and Health Technologies, Universidade Lusófona de Humanidades e Tecnologias
Av. Campo Grande 376, 1749-024 Lisbon, Portugal

16 April 2021

Abstract

Diabetes is an epidemic with frightening numbers worldwide. Despite the advancement in therapeutics, the disease is still associated with an important reduction of life expectancy and life quality. Therefore, new strategies are needed to overcome this personal, social, and economic burden. A commonly overseen aspect in diabetes onset and progression is the aggregation of Islet Amyloid PolyPeptide (IAPP), or amylin, in pancreatic β-cells. Notwithstanding, IAPP deposition is a histopathological hallmark of the disease. Dietary (poly)phenols (PPs), and their low molecular weight metabolites, have been associated with the inhibition of pathological protein aggregation. Benefiting from an in-house library of PPs metabolites, predicted to be found in the human blood after PPs-rich food consumption, we carried out in silico studies to identify potential metabolites interacting with IAPP. The simulations pointed out ellagitannin metabolites, the Urolithins (Uro), as the best performing molecules, particularly UroB. The ability of UroB to interfere with the kinetics of IAPP fibril formation was first validated in cell-free assays. Most importantly, UroB was shown to modulate the size and morphology of IAPP fibrils. In vitro, UroB protected against IAPP-induced cytotoxicity majorly by mechanisms associated with the modulation of calcium signaling pathways as revealed by transcriptomic analysis. Consistent with the central role of calcium signaling in insulin secretion, UroB increased hyperglycemia-induced insulin secretion and attenuated oxidative stress in response to both hyperglycemia and hyperlipidemia. Overall, our study reveals that UroB interacts with IAPP protecting β-cells against IAPP proteotoxicity by mechanisms including the modulation of calcium signaling pathways, insulin secretion and cell antioxidant responses. Being UroB a bioavailable metabolite resulting from the consumption of ellagitannin-rich foods, this study may open new venues for the exploration of dietary strategies contributing to diabetes control.

Lecturer's resumé

Regina Menezes scientific career began with a degree in Biological Sciences and a MSc degree in Genetics by Federal University of Rio de Janeiro (UFRJ). She was then warded a 2-years German fellowship from Deutscher Akademischer Austauschdienst (DAAD) to develop the PhD thesis studies at Heinrich-Heine Duesseldorf University. After obtaining a PhD in Genetics by UFRJ, she moved to Portugal as a Post-Doc researcher at ITQB NOVA. In 2016, she redirected her research interests to the diabetes field. The project "Therapeutics4DM - Towards the elucidation of islet amyloid peptide role in diabetes mellitus: opening new venues for therapeutic intervention" attracted the attention of diabetes researchers and medical doctors, and in the same year she was awarded the Nuno Castelo Branco Prize from SPD. As a researcher at iBET, in 2018 she was awarded 2 Research Grants for Therapeutics4DM-related projects, funded by FCT and in the framework of iNova4Health Internal Collaborative Projects. Currently a researcher at CBIOS, her career achievements include: participation in 15 research projects; 41 papers; 3 book chapters; h-index of 17 (Scopus, counting over 3943 citations); cumulative impact factor over 75; 14 oral communications in scientific meetings; more than 60 poster presentations (17 as published abstracts); and 7 meetings organization. As an international recognition of her scientific path she has also been invited as Reviewer and Guest Editor by prestigious journals and as Evaluator Expert by International Scientific Agencies. Her main academic activities include: the supervision of 11 Post-Docs, PhDs and MScs; the participation in 10 PhD, MSc and BSc juris; and the contribution, as Invited Professor, to the MolBioS ITQB PhD Program, the Integrated Master Degree in Medicine at Nova Medical School and the Master in Health Products and Food Supplements at ECTS, Lusofona University.

Resposta da perfusão do pé à atividade intermitente e transferência de peso,durante o protocolo de "marcha no local"

Foot perfusion response to intermittent activity and weight transfer during the "step in place" protocol

Margarida Florindo [1,2] , Sérgio Nuno [1,3,4] and Luis Monteiro Rodrigues [1]

[1] Universidade Lusófona CBIOS - Research Center for Biosciences and Health Technologies, Av Campo Grande, 376, 1749- 024, Lisboa, Portugal
[2] ESSCVP the Portuguese Red Cross Health School. Dep. Physiotherapy, Lisboa, Portugal
[3] Clínica S João de Deus – CTD, Lisboa Portugal
[4] Escola Superior de Tecnologia da Saúde de Lisboa –ESTeSL Lisboas' Polytechnic Institute, Lisboa, Portugal

7 May 2021

Abstract

As adaptações fisiológicas do fluxo sanguíneo nos membros inferiores dependem de múltiplos reguladores vasculares centrais e periféricos, com a atividade dinâmica a ter um papel preponderante na função vascular local. Este estudo teve como objetivo avaliar as variações da perfusão que ocorrem em ambos os pés, durante a fase de apoio e de não apoio do pé, durante a atividade Step in Place (SiP).

Metodologia: Este estudo envolveu um conjunto de 23 jovens saudáveis (24.9 ± 4.7 anos de idade) de ambos os sexos (12 homens e 11 mulheres). A perfusão de ambos os pés foi avaliada através de medidas não-invasivas: fluxometria por Laser Doppler (LDF), Fotopletismografia (PPG) e Espectroscopia Polarizada (EP) antes, durante e após o SiP. O protocolo foi dividido em 3 fases após um período de 15 minutos de adaptação ambiental. Na Fase 1 os voluntários mantiveram a posição de pé estática por 5 minutos (usando as 3 medidas para valores de baseline); Fase 2 – Durante 5 minutos os voluntários realizaram a atividade de SiP. Nesta fase a perfusão foi avaliada com EP em cada pé separadamente reunindo os dados de acordo com a sua posição relativamente ao solo, para avaliação da Concentração de Glóbulos Vermelhos do Sangue (CGVS) com o pé em apoio (inW) e sem apoio (noW). A Fase 3 - após a atividade avaliados os parâmetros novamente com as 3 medidas durante 5 minutos na mesma posição que a Fase 1. Não foram encontradas diferenças significativas entre lados nas fases 1 e 3. No entanto os resultados mostraram diferenças significativas entre as fases 1 e 3 em ambos os pés para CGVS avaliado com LDF direito (p=0.001) e esquerdo (descida não significativa) e EP direito (p=0.016) e esquerdo (0.001); Os valores de volume sanguíneo avaliados com PPG também mostraram diferenças significativas à direita (p=0.020) e á esquerda (p=0.002). Na Fase 2 foi registada com EP uma descida significativa nos pés inW direitos (p=0.002) e esquerdos (p=0.005) com subida em ambos os pés noW mas apenas significativa no pé esquerdo (p=0.045). Verificámos oscilações permanentes relacionadas com os períodos de apoio e de suspensão de ambos os pés e que ocorrem imediatamente com os estímulos, mostrando que existe uma pronta adaptação hemodinâmica da microcirculação de acordo com as diferentes provocações realizadas durante a atividade.

Lecturer's Resumé

Fisioterapeuta desde 1984, especializada na área de doenças neurológicas, com atuação clínica prática até o momento. Obteve o seu mestrado (2007) na Universidade de Évora em Ciências Sociais e Management Health Intervention e é professora assistente na Escola Superior de Saúde da Cruz Vermelha Portuguesa (ESSCVP-Lisboa). Aluna de doutoramento na Escola de Ciências da Saúde e Tecnologias da Universidade Lusófona e investigadora do CBIOS. Interesse especial nas áreas de movimento normal, motor controle, fisioterapia em neurologia e áreas relacionadas à circulação periférica e microcirculação.

Neuronal guidance cues control innate immunity through platelet-neutrophil interaction

A orientação neuronal permite o controlo da imunidade inata através da interacção neutrófilo-plaquetária

Tiago Granja

CBIOS Lusófona's Research Center for Biosciences and Health Technologies, Universidade Lusófona de Humanidades e Tecnologias
Av. Campo Grande 376, 1749-024 Lisbon, Portugal

28 May 2021

Abstract

From observing classical platelet function in vivo, this retrospective of my latest work will highlight innate immunity platelet functions. We will discuss neuronal guidance proteins conserved functions in the immune system. Under pro-inflammatory conditions such as ARDS (Acute Respiratory Distress Syndrome) or IRI (Ischemia/reperfusion Injury) we will follow the release and function of RBCs (Red Blood Cells) GPI-AP (Glycosylphosphatidylinositol-anchored proteins) Semaphorin7A in solution, after injury and consequent hemolysis. Later I will demonstrate how platelets sense this injury and signal neutrophils to map the injured sites and polarize to tether-roll-adhere and transmigrate into the affected tissues.

Lecturer's Resumé

Tiago Granja has recently integrated CBIOS - Lusófona University-Lisbon as a researcher after spending the last twelve years working as a researcher on innate immunity. His scientific career in immunology has started while finishing his graduation at the Lusófona University, with his thesis work carried on the Pharmacy Faculty at Nova University (with Prof. Elsa Anes) on macrophage phagosome maturation. Later he joined ITQB (Instituto de Tecnologia Química e Biológica) biotech group led by Prof. Inês Cardoso Pereira in collaboration with IGC (Instituto Gulbenkian a de Ciência) on the subject of Sulphur reductant bacteria. After winning a Leonardo Da Vinci Scholarship at Lusófona University he integrated one ITQB collaborator research group in Bonn-Germany to develop relevant molecular and cellular work. Soon after he integrated a Master's course in Coimbra at IBILI under the supervision of Prof. Anália do Carmo) in collaboration with ITQB. Finished his Master's work he was invited to integrate a PhD course at the cardiovascular and inflammation research group at the Bristol Royal Infirmary at the Bristol University, Bristol-United Kingdom led by Prof. Jamie Jeremy and Prof. Kai Zacharowski. To pursue his research on the function of shock organs under stress, he integrated a research group led by Prof. Rosenberger working on inflammation and microsurgery in Tübingen anesthesia department at the Uniklinik Tübingen-Germany. In Tübingen, research work was developed and published with multiple collaborations over different aspects of immunology.

Ionic Liquids: from chiral to magnetic... until the present moment

Líquidos Iónicos: do quiral ao magnético... até ao momento presente

Andreia Rosatella

CBIOS Lusófona's Research Center for Biosciences and Health Technologies, Universidade Lusófona de Humanidades e Tecnologias
Av. Campo Grande 376, 1749-024 Lisbon, Portugal

30 June 2021

Abstract

In a review of my past work, I will mainly focus on the high potential of Ionic Liquids. Ionic Liquids (ILs) are defined as salts that have a melting point below 100 ºC, formed by nitrogen-, sulphur- or phosphorous-containing organic cations, in combination with organic or inorganic anions. They are versatile compounds and have been investigated for an extensive range of applications including in solvent chemistry, catalysis, and electrochemistry. In the pharmaceutical areas, ILs have been investigated as pharmaceuticals (API-ILs) aiming for liquid therapeutics, as solvents, reagents, and anti-solvents in the synthesis and crystallization of APIs, as solvents, co-solvents and emulsifiers in drug formulations, and the development and/or improvement of drug-delivery-based systems. Being some of these applications already explored by CBIOS-DDS domain. In this presentation, I will tell you my story with Ionic Liquids from a synthetic point of view. Starting with first-generation ILs that could be highly toxic, passing through paramagnetic and smart ILs, and finishing with the biofriendly third generation of ILs.

Lecturer's resumé

Andreia A. Rosatella started her chemistry career with a degree in Chemistry applied to organic chemistry, in FCT-UNL. Later she obtained her PhD at Instituto Superior Técnico – UL, in 2011, where she focused on the development of new synthetic methodologies for the oxidation of alkenes, and also in the synthesis of several Ionic Liquids. She took a postdoctoral fellow in the Faculty of Pharmacy where she continued to design and develop new Ionic Liquids in combination with several other research projects, namely synthesis of magnetic materials and optimizing oxidation reactions by flow chemistry. In 2018 she spend a year in Centro de Ciências e Tecnologias Nucleares do Instituto Superior Técnico where she focus on the characterization of Paramagnetic Materials. In 2019 she becomes a researcher in iMed-UL for the development of new materials for biological applications, namely hydrogels based on biofriendly ionic liquids. In addition, her career was supported by a consolidated network of national and international partners that allowed a broader knowledge of several techniques. In 2021 she integrated CBIOS - Lusófona University as a researcher where are expected new chemical challenges applied to pharmaceutical sciences.

In vitro plant culture and production of volatile phytochemicals

Cultura in vitro *de plantas e produção de fitoquímicos voláteis*

Ana Cristina Figueiredo

Centro de Estudos do Ambiente e do Mar (CESAM Lisboa), Faculdade de Ciências da Universidade de Lisboa, Centro de Biotecnologia Vegetal (CBV), DBV, C2, Piso 1, Campo Grande, 1749-016 Lisboa, Portugal
acsf@fc.ul.ptl

5 November 2021

Abstract

As plantas produzem uma enorme diversidade de compostos de elevado interesse comercial, industrial e medicinal. Contudo, vários fatores afetam a produção continuada desses compostos na natureza, como variações fisiológicas, alterações ambientais, de armazenamento, entre muitas outras. Alguns dos métodos desenvolvidos para obviar esses problemas, passam pela síntese química de base, pela semi-síntese, ou pela cultura in vitro de plantas. No contexto das vantagens e desvantagens da cultura in vitro de plantas, as culturas de rebentos, de células em suspensão e de raízes transgénicas (hairy roots) podem ser exploradas como via alternativa de produção de fitoquímicos voláteis. Qualquer um destes sistemas pode ser, entre outros, otimizado com ensaios de biotransformação, eliciação, crescimento em biorreator, ou em sistema de duas fases. Adicionalmente, as co-culturas in vitro constituem um sistema experimental modelo, que permite a avaliação das inter-relações planta-organismo e a sua resposta à aplicação de diferentes tipos de substâncias bioativas contra pragas agro-florestais.

Agradecimentos

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Lecturer's Resumé

Ana Cristina Figueiredo é Professora Associada com Agregação do Departamento de Biologia Vegetal da Faculdade de Ciências da Universidade de Lisboa (FCUL) e Investigadora do Centro de Biotecnologia Vegetal (CBV) do Laboratório Associado Centro de Estudos do Ambiente e do Mar Lisboa (CESAM Lisboa) na área de Biologia de Adaptação e Processos Ecológicos. Enquanto docente da FCUL leccionou, e lecciona, várias disciplinas Licenciatura, Mestrado e Doutoramento, e é, ou foi, responsável pela orientação de Estágios, Mestrados e Bolseiros de Investigação Científica. Foi, ou é, responsável pela orientação e/ou co-orientação de Doutorandos Nacionais e Internacionais e é co-autora de Publicações Pedagógicas. A actividade científica tem-se centrado nas áreas da Biotecnologia Vegetal, Fitoquímica, Biologia Celular e Biologia da Secreção Vegetal, e foi, ou é, investigadora, e/ou investigadora responsável, de projectos nacionais e internacionais. Consta do seu CV, a apresentação de comunicações orais e painéis em reuniões científicas, nacionais e internacionais. É autora e co-autora de artigos em atas de congressos, co-editora de livros, co-autora de capítulos de livros e de publicações em revistas internacionais com arbitragem científica.

Wo gehest du hin? "Where are you heading?"

Wo gehest du hin? "Para onde vai?"

Daniel dos Santos

CBIOS Lusófona's Research Center for Biosciences and Health Technologies, Universidade Lusófona de Humanidades e Tecnologias
Av. Campo Grande 376, 1749-024 Lisbon, Portugal

10 December 2021

Abstract

In this talk, I will present my latest research lines mainly focused on multidrug resistance obtained by overexpression of ABC transporters. I will show the computational techniques used and how they can fit the needs of other research lines within CBIOS and how to use this information to provide avant-garde classes in the area of chemistry/biochemistry, computation, and modeling. Finally, new research just started at CBIOS will be presented and some future perspectives about what directions are important to proceed.

Lecture's resumé

I am a Chemist with a PhD in Computational Chemistry (2003) by the Fac. of Sciences Univ. of Porto supervised by Prof. Ferreira Gomes.

In 2004 I was a postdoc in Sweden supervised by Prof. Leif Eriksson and in 2005-6 in Germany, supervised by Prof. Florian Müller-Plathe.

In 2007 I returned to Portugal to work as a postdoc at the Faculty of Pharmacy of the Univ. of Lisbon in Prof. Rui Moreira's lab. In 2008 I was hired as an FCT researcher (Ciência2007 research program) in the same lab and thereafter at REQUIMTE/ Faculty of Sciences, University of Porto (Ciência2008 and REQUIMTE research programs) in the group of Prof. Natalia Cordeiro.

Presently I am an Assistant Researcher at CBIOS/Universidade Lusófona de Humanidades e Tecnologia (Lisbon) where I develop an independent research line (soft matter, with medicinal chemistry applications particularly in multidrug resistance).

My main scientific contributions are in the field of Multidrug resistance particularly regarding the study of ABC transporters with an ongoing financed FCT project as Co-PI. However, I also develop research on other subject matter through FCT financed ongoing projects as leader of the computational team (one) or Co-PI (three): i) Studying the Cystic Fibrosis Transmembrane Conductance Regulator (CFTR, ABCC7) to rescue F508del-CFTR and other mutants ii) Developing novel strategies to find new therapeutic approaches to the most common mitochondrial fatty acid beta-oxidation disorder (mFAOD), iii) Developing selective pharmacological modulators for Protein Kinase C (PKC) isozymes and use computational approaches to find novel p53-MDM2 interaction inhibitors also for fighting cancer.

I participated in 13 projects (4 still ongoing) either as PI (2), Co-PI (4), leader of the computational team (3), consultant (1), or member of the computational team. I published more than 50 articles in top peer-reviewed journals, 3 book chapters and participated in the organization of 3 national conferences.

My work was presented through more than 100 posters and more than 50 oral communications (14 invited). I supervised 5 PhD theses (3 ongoings), 3 MSc theses dissertations, 7 post-doc researchers, and 7 scientific initiations. I was a member in 8 academic juries of PhD and master vivas (4 as the main arguer). Presently I am a Vice-President of the Computational Chemistry group of the Portuguese Chemical Society, after being president.