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BBR BIOMEDICAL AND
BIOPHARMACEUTICAL
RESEARCH

VOLUME 20, Issue 2 (2023)
pp. 1-68
doi: 10.19277/bbr.20.2.320

INVESTIGAÇÃO
BIOMÉDICA E
BIOFARMACÉUTICA

IBB

V JORNADAS CBIOS

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Program

- 09:00-09:15 Opening - Prof. Luis Monteiro Rodrigues, CBIOS director
- Session I** (Moderators: Catarina Rosado, Luis Monteiro Rodrigues)
09:15-09:45 Invited Speaker – **Nuno C. Santos**, Instituto de Medicina Molecular: *Atomic force microscopy as a nanotool for cardiovascular research*
09:45-10:00 CBIOS Researcher I – Catarina Pereira Leite: *On the trail of biomaterial-based nanosolutions for skin health*
10:00-10:10 Flash talk 1 – João Vieira: Multifunctional cerosomes: a triad to tackle Xeroderma Pigmentosum
10:10-10:20 Flash talk 2 – Cíntia Almeida: Further Exploring Solid Lipid Nanoparticles Based on the Lipid Fraction From Larvae Biomass Extract - In Vivo Safety and Efficacy Assays
- 10:20-11:00 Coffee break & Poster session I**
- Session II** (Moderators: Leandro Oliveira, Emília Alves)
11:00-11:30 Invited Speaker – **Paulo Matafome**, Universidade de Coimbra: *Neuroendocrine (dys)regulation of adipose tissue in obesity*
11:30-11:45 CBIOS Researcher II – Regina Menezes: *Seeking natural compounds for pancreatic beta cell function in diabetes*
- Session III** (Moderator: Ana Fernandes)
11:45-12:30 Invited Speaker – **Catarina Ramos**, Champalimaud Centre for the Unknown: *Why is science communication relevant?*
- 12:30- 13:45 Lunch**
- Session IV** (Moderators: Nuno Saraiva, João Costa)
13:45-14:15 Invited Speaker – **Maria José Oliveira**, I3S-Instituto de Investigação e Inovação em Saúde: *The immune suppressive role of the Extracellular Matrix*
14:15-14:30 CBIOS Researcher III – Ana Fernandes: *LusoModLox: in search of therapeutic lysyl oxidase inhibitors*
14:30-14:40 Flash talk 3 – Margarida Florindo: The relationship between blood pressure hemodynamics and the lower limb perfusion asymmetries in healthy individuals
14:40-14:50 Flash talk 4 – Paulo Luz: Real-World Insights: Exploring Predictive Factors for Pathological Complete Response in HER2+ Breast Cancer
- 14:50-15:30 Coffee break & Poster session II**

- Session V** (Moderators: Cíntia Pêgo, António Raposo)
- 15:30-15:40 Selected Flash talk 5 – José Brito: Structural and functional insights into hydrogen sulfide homeostasis in pathogenic bacteria
- 15:40-15:50 Flash talk 6 – Tatiana Fontes: Contribution of diet quality to cardiovascular risk: Mediterranean vs. Vegetarian dietary patterns
- 15:50-16:00 Flash talk 7 – Sofia Ferreira: Amyloidogenesis as a therapeutic target in diabetes: the power of urolithins in modulating IAPP aggregation and cytotoxicity
-
- Session VI** (Moderators: Patrícia Rijo, Daniel dos Santos)
- 16:00-16:30 Invited Speaker – **Maria Santos**, imed-Research Institute for Medicines: *Drug optimization approaches targeting p53 in the treatment of cancer*
- 16:30-16:45 CBIOS Researcher IV - Andreia Rosatella: *Photoswitchable materials based on Ionic Liquids*
- 16:45-16:55 Flash talk 8 – Márcia Filipe: Methanolic extracts from *Plectranthus* spp. and their biological activity for dermocosmetic uses.
- 16:55-17:05 Flash talk 9 – Vera Isca: 7 α -acetoxy-6 β -hydroxyroyleanone from *Plectranthus* spp. as a lead compound for breast cancer therapy
- 17:05-17:15 Selected Flash talk 10 - Sofia Ramos: Synchronized expression dysregulation of Redox and Calcium-related genes: implications for breast cancer patient survival
-
- 17:15-18:00 Concluding remarks and prizes

Abstracts

CBIOS Researcher Talks

CBIOS Researcher I

On the trail of biomaterial-based nanosolutions for skin health

Catarina Pereira-Leite^{1,2}, Cíntia Almeida^{1,3}, Ana Júlio^{1,3}, João Vieira^{1,3}, Rossana Roque^{1,3}, Carla Turiel⁴, Nuno Saraiva¹, Catarina Rosado¹

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The maintenance of the epidermal barrier function is pivotal for skin health. It is also well-known that changes in the lipid matrix of the stratum corneum underly a variety of cutaneous diseases, such as atopic dermatitis [1]. Thus, providing fatty acids (FA) and ceramides (CER) to reinforce the skin barrier function is a key strategy used in cosmetic and pharmaceutical formulations. Various sources of FA are available in nature, especially in vegetable oils, but *Hermetia illucens* larvae biomass is particularly relevant as it is based on the principle of the circular economy [2]. The lipid fraction of the larvae biomass was explored as a dual-acting ingredient – providing the scaffold to design lipid nanoparticles and reinforcing the skin barrier due to its emollient properties. Thus, this work aimed at developing nanoparticles to load a model glucocorticoid for the management of atopic dermatitis. The nanocarriers were developed by a quality-by-design strategy, which was successfully employed as their physicochemical properties were found to be suitable for topical administration. These nanoparticles were also stable upon room temperature storage and were able to release the total amount of loaded glucocorticoid. Using a keratinocyte cell line, the loaded nanocarriers were found to be cytocompatible. Therefore, the design of innovative lipid nanocarriers based on this sustainable biomaterial is becoming progressively a reality.

Acknowledgments. This study was financially supported by FCT - Foundation for Science and Technology, I.P., through funding EXPL/BTM-MAT/0112/2021, UIDB/04567/2020, and UIDP/04567/2020, as well as by the research grants attributed to C.A. (UI/BD/151423/2021) and J.V. (UIDP/04567/2020). The authors also thank Entogreen® for kindly providing the *Hermetia illucens* larvae.

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CBIOS Researcher II

Seeking natural compounds for pancreatic β -cell function in diabetes

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Diabetes stands as a paramount health challenge of 21st century. Despite its multifaceted origin, the primary culprits are insulin deficiency and resistance associated with the loss of pancreatic β -cells. Importantly, the role of Islet Amyloid Polypeptide (IAPP) aggregation and its deposition within the pancreas has long been underestimated as a contributing factor to β -cell dysfunction and loss. Our research team is committed to addressing this oversight by focusing on the inhibition of IAPP aggregation and the transdifferentiation of pancreatic α -cells into insulin-producing cells. These approaches aim to preserve β -cell mass and insulin production, potentially improving glycemic control in individuals with diabetes. In our quest, we have unraveled the intricate molecular mechanisms responsible for the pathological aggregation of IAPP. Furthermore, we have identified colonic metabolites derived from dietary (poly)phenols, such as urolithins, which exhibit potent inhibitory effects on IAPP amyloid formation. Additionally, we are exploring the pleiotropic action and low intrinsic toxicity of (poly)phenols as chemical inducers of molecular pathways underlying α -cell transdifferentiation into β -cell-like insulin producers identified by integrative multi-omic analysis.

Acknowledgments:

FCT-Foundation for Science and Technology, I.P. (Portugal), under the [UIDB/04567/2020] and [UIDP/04567/2020] projects. COFAC/ILIND—Cooperativa De Formação e Animação Cultural CRL/Instituto Lusófono de Investigação e Desenvolvimento (grant COFAC/ILIND/FAZER+ EXPLORER). R.M. is funded by FCT Scientific Employment Stimulus contract [reference numbers CEEC/04567/CBIOS/2020].

CBIOS Researcher III

LusoModLox: in search of therapeutic lysyl oxidase inhibitors

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Lysyl oxidase (LOX) and LOXL 1-4 are amine oxidases, which catalyze the cross-linking of elastin and collagen in the extracellular matrix (ECM), increasing its stiffness. [1]. LOXs activity is augmented in several pathological processes, including cancer progression and tissue scarring. Therefore, LOXs inhibitors may have beneficial effects in cancer and skin repair therapies. This work aims to find novel LOXs inhibitors for these therapeutic applications in breast cancer (BC) and skin wound healing.

In the case of BC, we carried out a bioinformatic analysis that revealed that the overexpression of LOXL2 has a negative impact on disease-free survival, particularly in basal BC [2]. To gain insights into the potential binding modes of inhibitors to LOXL2 enzyme, docking studies using inhibitors previously documented in the literature were carried out. Novel inhibitors were searched from two sources: an in-house library of phytochemical compounds, and compounds suggested by docking studies. Compounds were screened for their anti-LOXL2 activity, using the Amplex Ultra Red technique [3]. This approach allowed the identification of 3 novel promising LOXL2 inhibitors.

The cytotoxicity of the 3 inhibitors was evaluated in human breast cell models of triple negative BC (MDA-MB-231) and normal-like tissue (MCF10A). The impact of the compounds in the migratory properties of MDA-MB-231 cells was assessed using the wound-healing assay for collective migration, transwell assays for chemotaxis and chemoinvasion, and single-cell tracking for random migration [4]. At non-toxic concentrations, the inhibitors were able to impact on cell migration, particularly on chemotaxis and chemoinvasion.

Regarding the possible application of LOXs inhibitors in skin repair, studies were conducted using the pan-LOX inhibitor β -Aminopropionitrile (BAPN) and two phytochemicals with mild LOXL2 inhibition. Cytotoxicity and collective migration studies were performed in human keratinocytes (HaCaT). Results suggested that BAPN was the most promising compound to be developed as an anti-scarring drug. For this purpose, nanoformulations composed of solid lipid nanoparticles containing BAPN were produced. These nanoparticles demonstrated adequate characteristics, stability, and biocompatibility, and should be further developed towards a cutaneous application.

Overall, we herein present a multidisciplinary approach for the discovery of novel LOXs inhibitors and provide new insights on the usefulness of such compounds in two therapeutic fields of great societal impact: breast cancer and skin repair.

Acknowledgments: This work is funded by FCT-Foundation for Science and Technology (UIDB/04567/2020 and UIDP/04567/2020), and by Universidade Lusófona/ILIND grant programs Fazer+ (Project LusoModLOX - ILIND/F+/EI/01/2020) and Seed Funding (Project CoSysCan - COFAC/ILIND/CBIOS/1/2021).

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CBIOS Researcher IV

Photoswitchable Materials based on Ionic Liquids

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While the first documented utilization of ionic liquids (ILs) dates back to the previous century, it was only in the last two decades that the ILs field has experienced an exponential growth in publications. And just when it seemed that scientific interest in ILs might start to decrease, a resurgence has occurred, driven by the development of new generations of ILs that are less toxic and biodegradable, expanding the applications of ILs beyond the realm of biology to various other domains. Our research team has contributed to this trend [1,2] and also developed magnetic ILs with low toxicity.

ILs are desirable materials not only due to their adaptable properties but also because they can be easily integrated into other materials, particularly polymers, enabling the creation of smart materials [3,4]. For instance, photo-responsive properties can be integrated on ILs through the incorporation of photochromic moieties into either cations or anions and further attached to the final polymer [4].

Gelatin, a cost-effective, water-soluble form of denatured collagen with inherent biocompatibility, have some limitations in terms of its suitability as a hydrogel material due to its inadequate mechanical properties. To enhance its applicability, gelatin is often combined with other polymers, such as alginate, chitosan, or hyaluronic acid, to bolster the structural integrity of the resulting hydrogel. Alternatively, derivatization methods, typically involving the addition of methacrylate groups to the amine-containing side chains of gelatin, are employed to create photopolymerizable hydrogels[5].

In this work we describe a new generation of materials that combines chemical versatility of ILs with the morphological flexibility of biopolymers with photochromic properties.

Acknowledgements:

The authors also thank Fundação para a Ciência e Tecnologia (FCT) (Ref. PTDC/QUI-QOR/32008/2017, PTDC/CTM-CTM/29869/2017, UIDB/04138/2020, UIDP/04138/2020, UIDB/04567/2020 and UIDP/04567/2020, EXPL/OCE-ETA/1109/2021 and SFRH/BD/137671/2018) for financial support.

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Flash Talks

Flash Talk 1

Multifunctional cerosomes: a triad to tackle Xeroderma Pigmentosum

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Flash Talk 2

Further Exploring Solid Lipid Nanoparticles Based on the Lipid Fraction From Larvae Biomass Extract - In Vivo Safety and Efficacy Assays

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Flash Talk 3

The relationship between blood pressure hemodynamics and the lower limb perfusion asymmetries in healthy individuals

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Peripheral vascular disease typically involves perfusion asymmetries in the lower limb. These perfusion variations between limbs, have been commonly found in healthy individuals. Its significance is not clear although sex, age and body mass index have been identified as determinants. Here we investigated the potential relationship between perfusion asymmetries and blood pressure before and after regular gait. The study followed all principles of good clinical practice for human research, involving thirteen healthy individuals, mean age 24.9 ± 5.9 y.o. Perfusion assessed by laser Doppler flowmetry expressed in Perfusion Units (PU) and blood velocity (V), and by photoplethysmography expressed as blood volume (BV). Sensors were applied in the antero-internal region of each foot and data collected in three phases: phase 1 basal, one minute standing still; phase 2, one minute after five minutes of regular walking; and phase 3 standing still for recovery. Blood pressure systolic and diastolic, calculated mean blood pressure, and pulse rate were also registered. In baseline, significant differences were found in the intra-individual perfusion (right and left limb) of PU, V and BV ($p=0.001$; $p=0.028$ and $p=0.045$), which disappeared with the activity and in recovery. Using Spearman's coefficient tests we found a positive and significant correlation between PU asymmetries and systolic pressure and mean blood pressure, in phase 1 indicating that greater differences between limbs might be associated with higher blood pressure values. No matter the exploratory nature of this study, these links support our views that higher perfusion asymmetries between limbs might accelerate vascular pathology in the presence of other determinants.

Acknowledgments:

This work was supported by national funds from FCT–Fundação para a Ciência e a Tecnologia, I.P, with in the project UIDB/04567P/2020 / UIDP/04567B/2020

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Flash Talk 4

Real-World Insights: Exploring Predictive Factors for Pathological Complete Response in HER2+ Breast Cancer

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Neoadjuvant therapy (NAT) has emerged as a pivotal approach in managing HER2+ breast carcinoma, providing an ideal platform for comprehensive translational, drug, and biomarker investigations, with a complete pathological response (pCR) as a critical endpoint. Achieving pCR post-NAT consistently correlates with a favorable prognosis and prolonged disease-free survival, with a 5-year DFS reaching approximately 85% in pCR cases and 76% in non-pCR cases. In the quest for personalized treatment, the identification of novel biomarkers is imperative for predicting pCR and relapse. Notably, tumor-infiltrating lymphocytes (TILs) have gained prominence for their potential as immunological markers and predictors of NAT response, also serving as prognostic indicators.

This retrospective multicentric study enrolled HER2+ early breast cancer patients from Portuguese, Spanish, Chilean, and Cuban hospitals (January 2018–December 2022) who underwent NAT with dual HER2 blockade (trastuzumab and pertuzumab), followed by surgery. Additionally, paraffin blocks from surgical specimens of a subpopulation were processed at each hospital's Pathology service. TILs were evaluated according to international guidelines. Statistical analysis used the chi-squared/Fisher's exact test for associations, multivariate logistic regression for pCR, and Kaplan–Meier method for event-free survival (EFS).

A total of 501 patients were included in the study. The cohort had an average age of 53, with 65% being hormone receptor-positive (RH+) and 58% having nodal involvement (N+). Of the patients, 60.7% achieved pCR. During follow-up, 36 patients experienced relapse. TILs scores on surgical specimens were generally lower than in biopsies and were correlated with pCR.

These findings underscore the significance of TILs as potential predictive markers, highlighting the imperative for further investigation. This study lays the foundation for refining HER2+ breast cancer treatment strategies and optimizing patient outcomes.

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Flash Talk 6

Contribution of diet quality to cardiovascular risk: Mediterranean vs. Vegetarian dietary patterns

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Cardiovascular diseases are responsible for around 90% of mortality in the European region [1]. The role of nutrition in this disease has been extensively studied and diets with little or no consumption of animal products have been widely associated with better values of body composition and lipid profile, and consequently, with a lower cardiovascular risk [2]. That said, the objective of the present study was to compare the cardiovascular risk and its risk factors of vegetarian (with high diet quality) and omnivorous (with high adherence to the Mediterranean Diet [MedDiet]) individuals. A cross-sectional study was carried out on 110 participants (55 vegetarians and 55 omnivores). High adherence to the MedDiet (MedDiet ≥ 10 points) was calculated using the PREDIMED questionnaire [3] and high quality of the vegetarian diet using the healthy plant-based diet index (hPDI ≥ 52 points) [4]. Body composition was assessed using a dual-energy x-ray absorptiometry, biochemical parameters were obtained from capillary blood and the 10-year risk for cardiovascular disease was calculated using the score2. MedDiet ≥ 10 in omnivores (OR=0.861; p=0.013) and hPDI ≥ 52 in vegetarians (OR=0.590; p=0.001) demonstrated to be protective factors for a high score2 in 41% and 13.9%, respectively. Omnivorous individuals with MedDiet ≥ 10 had lower fat mass (OM:25.79% versus VG:32.12%; p=0.003) and lower visceral adipose tissue (OM:338.76cm³ versus VG:609.04cm³; p=0.023), than their vegetarian counterparts. On the other hand, vegetarian individuals with an hPDI ≥ 52 had lower total cholesterol values (OM:198.05mg/dL versus VG:173.48mg/dL; p=0.013). No other differences were found between groups. Our study concluded that a healthier diet contributes to a more favorable distribution of adipose tissue as well as different cardiometabolic parameters. This healthy diet does not seem to have to necessarily exclude products of animal origin, as better results have been observed associated with good adherence to the MedDiet.

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Flash Talk 7

Amyloidogenesis as a therapeutic target in diabetes: the power of urolithins in modulating IAPP aggregation and cytotoxicity

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Amyloidogenesis is an intricate process where misfolded peptides undergo spontaneous self-assembly, forming oligomers, protofibrils, and mature amyloid fibrils. Pathological aggregation of Islet Amyloid Polypeptide (IAPP) is known to adversely affect β -cell functions, contributing to the onset and progression of diabetes. The pleiotropic action of (poly)phenols toward diabetes is well-documented. Importantly, research has demonstrated that distinct classes of dietary (poly)phenols may interfere with different steps of the oligomerization process. Most of these compounds, however, have no to little bioavailability in the target tissues.

Here, we screened an in-house collection of bioavailable (poly)phenol metabolites towards their ability to modulate IAPP oligomerization and consequently recover β -cell functionality. *In silico* docking studies using AutoDock Vina and Pymol pointed out ellagitannin metabolites, particularly Urolithin A (UroA) and Urolithin B (UroB), as the best-performing molecules to physically interact with IAPP. The ability of urolithins to modulate IAPP amyloid formation was assessed by cell-free methodologies, including Thioflavin T assay and transmission electron microscopy. Both compounds showed high potential to interfere with IAPP fibril kinetics, size, and morphology. In the pancreatic β -cell line INS-1 832/3 challenged with *in vitro* pre-formed IAPP aggregates, UroB protected against IAPP-induced cytotoxicity majorly by mechanisms associated with redox homeostasis, calcium intracellular mobilization, mitochondrial respiration, and improved glucose-stimulated insulin secretion. Transcriptomic analysis showed that IAPP aggregates formed in the presence of UroA modulate cellular pathways related to metabolism, cellular energy, and oxidative stress. Our findings unveiled the potential of UroA and UroB to interact directly with IAPP, thus modulating amyloid formation. In the cellular milieu, both metabolites enhanced cellular proteostasis mechanisms allowing β -cells to better cope with the IAPP burden. These promising results open a new venue for the exploitation of dietary urolithins as inhibitors of IAPP aggregation with potential implications for diabetes.

Acknowledgments:

FCT-Foundation for Science and Technology, I.P. (Portugal), under the [UIDB/04567/2020] and [UIDP/04567/2020] projects. COFAC/ILIND—Cooperativa De Formação e Animação Cultural CRL/Instituto Lusófono de Investigação e Desenvolvimento (grant COFAC/ILIND/FAZER+ EXPLORER). R.M. is funded by FCT Scientific Employment Stimulus contract [reference numbers CEEC/04567/CBIOS/2020].

Flash Talk 8

Methanolic extracts from *Plectranthus* spp. and their biological activity for dermocosmetic uses.

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The search for natural products as active ingredients in cosmetics has gained increased interest among the scientific community in recent years. *Plectranthus* spp. is a well-known genus used in traditional medicine for skin conditions. It belongs to the Lamiaceae family and is distributed in tropical areas of the globe. The aim of this work was to scientifically validate the use of these species for skin disorders and to probe potential applications for cosmetic formulations. Therefore, we assessed and evaluated the biological activity of the eight spp. of *Plectranthus* (*P. ambiguous*-Pa, *P. barbatus*-Pb, *P. cylindraceus*-Pc, *P. ecklonii*-Pe, *P. fruticosus*-Pf, *P. grandidentatus*-Pg, *P. hadiensis*-Ph and *P. madagascariensis*-Pm) cited as traditionally used for skin conditions. The plant samples were collected and dried at room temperature, then methanol ultrasound-assisted extractions (10% w/v) were performed. Methanolic extracts were screened to assay their potential bioactivity such as general toxicity (brine shrimp lethality test), antimicrobial (well diffusion method and microdilution assay) and antioxidant (DPPH, TBARS and CAA methods) activities. Moreover, skin-related enzymes (elastase, collagenase and tyrosinase) inhibition profile, anti-inflammatory activity (RAW 264.7 macrophages) and cytotoxic effects in skin cell lines (keratinocytes and fibroblasts) were also evaluated. Furthermore, the phytochemistry profile of the three most bioactive extracts was analysed through HPLC-DAD. The extracts showed no general toxicity but exhibited effective antibacterial activity against Gram-positive bacteria strains, and moderate to high antioxidant activity. The Pa, Ph, and Pm extracts demonstrated moderate anti-inflammatory activity. Regarding cytotoxicity, all tested extracts showed to be non-cytotoxic against HaCaT and HFF-1 cells. The enzymatic activity showed promising results, Pe exhibited the highest activity in elastase and tyrosinase inhibition, while Pc was the most active in collagenase inhibition. Phytochemistry profile analysis through HPLC-DAD revealed the presence of rosmarinic acid (RA) in the composition of extracts Pc, Pe, and Pg, which can be correlated to the observed bioactivities for future skin applications.

Acknowledgements:

This work was supported by the Foundation for Science and Technology (FCT, Portugal) for financial support through national funds FCT/MCTES (PIDDAC) to CIMO (UIDB/00690/2020 and UIDP/00690/2020) and SusTEC (LA/P/0007/2020), to the projects UIDB/04539/2020 and UIDP/04539/2020, and the contracts of L. Barros and R.C. Calhelha through the institutional scientific employment program-contract. M.S.F. would like to thank to FCT for her grant (SFRH/BI-Mestre/2023). V.M.S.I. would like to thank FCT for their PhD grant (SFRH/BD/137671/2018).

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DOI:10.1080/14756366.2020.1862099.

Flash Talk 9

7 α -acetoxy-6 β -hydroxyroyleanone from *Plectranthus* spp. as a lead compound for breast cancer therapy

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Breast cancer is the most prevalent cancer worldwide [1]. PKC- α activation is associated with a tumor suppressive role in breast cancer [2]. *Plectranthus* spp. are recognized for their extensive ethnobotanical applications and by the presence of bioactive compounds with potential antitumoral activities. Specifically, the compound 7 α -acetoxy-6 β hydroxyroyleanone (Roy 1) exhibit cytotoxicity against several cancer cell lines [2]. In this context, Roy 1 was investigated as a lead compound for the development of new antitumoral drugs for breast cancer therapy. Accordingly, the ultrasound-assisted extraction method of Roy 1 from *P. grandidentatus* was optimized by completing three cycles of 30 minutes each, which improved the isolation yield (46.8 $\mu\text{g}\cdot\text{mg}^{-1}$). Subsequently, Roy 1 was isolated (1.0 g) and thirty new derivatives (2 to 31) were synthesized from Roy 1 aiming to enhance its cytotoxic potential. The aqueous stability of Roy 1 and standard derivatives 2 and 20 was evaluated. Results indicate that 1, 2 and 20 were completely stable in aqueous medium (0.1 mM, pH 7.4, and 37°C, for 10 days). Additionally, the cytotoxic activity of all compounds was evaluated in breast cancer cell lines (MCF-7, MDBA-MB-231 and MDBA-MB-468) and as PKC- α activators. Natural compound 1 and most of the derivatives (2-31) were activity against the breast cancer cell lines tested. Compounds 6, 7, 18 and 21 showed the most promising results including low IC₅₀ and selectivity towards cancer cell lines. Accordingly, these derivatives were selected for evaluation as PKC- α activators in a yeast-based assay. Derivative 7 emerged as the most promising PKC- α activator. Moreover, in an additional PKC- α enzymatic assay 7 exhibit activation potential higher than the positive control (PMA), confirming its PKC- α activation potential for breast cancer therapy. These findings represent a significant advancement in our ongoing efforts to develop novel anticancer agents from natural sources.

Acknowledgements:

This research was funded by Foundation for Science and Technology (FCT, Portugal) for financial support through the projects UIDB/04539/2020 and UIDP/04539/2020 and the PhD grant (SFRH/BD/137671/2018).

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Selected Flash Talk 5

Structural and functional insights into hydrogen sulfide homeostasis in pathogenic bacteria

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Hydrogen sulfide is an ancient molecule present in Earth's primordial atmosphere and organisms from all Domains of Life soon evolved to utilize it in their physiology [1]. However, H₂S can have either beneficial or toxic effects, depending on the concentration. Therefore, tight regulation of intracellular H₂S/H₂S-derived more oxidized reactive sulfur species (RSS) is paramount for survival of all organisms. In bacterial pathogens, H₂S/RSS is regarded as an important component in microbial defense mechanisms against oxidative and antibiotic stress.

The *cst* operon in *Staphylococcus aureus* encodes a nearly complete mitochondrial-like H₂S oxidation system [2]. In addition, a *cst*-like operon has also been described in the human pathogen *E. faecalis*. Three enzymes encoded by these two operons include the coenzyme A persulfide reductase CoAPR, the multidomain persulfide dioxygenase-sulfurtransferase fusion protein CstB and the sulfide:quinone oxidoreductase SQR, which collectively protect the organism against H₂S and RSS toxicity.

Herein, we describe the X-ray crystallographic structures of full-length SaCstB (native and single cysteine substitution mutants) and the CoA-bound crystal structure of EfCoAPR [3,4]. Companion cryo-EM data on these enzymes suggest a high mobility of the C-terminal rhodanese domains that may be important for catalysis. The structures of sulfite-bound mutant CstBs suggests a mechanism by which the C-terminal domain facilitates the concerted oxidation of a thiol persulfide (RSSH) to thiosulfate and thiol, without the release of the toxic sulfite intermediate.

These studies provide an enhanced understanding of the mechanisms of H₂S/RSS homeostasis encoded by the RSS-regulated *cst* operons in bacteria.

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Selected Flash Talk 10

Synchronized expression dysregulation of Redox and Calcium-related genes: implications for breast cancer patient survival

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The complex interaction between cellular calcium (Ca²⁺) and reactive oxygen species (ROS) signaling systems significantly influences various biological processes. Dysregulated expression of genes that maintain the balance of Ca²⁺ and ROS homeostasis can significantly affect cancer cell behaviors, including proliferation, survival, and migration. However, the precise mechanisms underlying these interactions remain unclear. Breast Cancer (BC) remains a leading cause of death among women, underscoring the urgency in uncovering novel regulatory mechanisms, therapeutic targets, and potential biomarkers.

This study adopted a bioinformatics approach using TCGA data to explore the consequences of simultaneous dysregulation of selected genes involved in Ca²⁺ (TRPM8, CALM2, CAMK2G, ATP2C2, PLCD1, ORAI1, STIM1) and redox signaling (LOXL2, LOXL3, PRDX4, TXN, TXNRD1, GLRX2, GLRX3, SOD2, NOX4) on BC patients' survival. These genes were chosen based on significant differences in expression between normal and tumor tissues (p<0.05) and their impact on survival (hazard ratio (HR)<0.8 or >1.2). Cumulative proportion survival at 5-years post-diagnosis was calculated for each quartile of expression within the population expressing high (quartile 75) or low levels (quartile 25) of a second gene. Gene pairs consistently impacting cumulative survival were subjected to an enrichment analysis, exploring genes with expression correlated in BC with these pairs. This analysis was grounded in the biological processes of the Gene Ontology, highlighting processes with a False Discovery Rate (FDR)<0.05.

Our findings demonstrate that simultaneous dysregulation of specific gene pairs significantly correlates with patient survival. These gene pairs include GLRX3/LOXL3, PRDX4/LOXL2, NOX4/PRDX4, TRPM8/CAM2G, ATP2C2/TRPM8, CAMK2G/STIM1, ATP2C2/GLRX2, and PLCD1/TXNRD1. Impressively, these gene pairs co-occur with genes intricately associated with cell cycle regulation, adhesion, and cellular projection processes within the BC context. This approach shows promise in advancing the discovery of robust BC prognosis biomarkers. Further validation through *in vitro* models representing the diverse BC cell phenotypes linked with progression is the next crucial step in unveiling the complex molecular mechanisms governing Ca²⁺ and ROS regulation in BC and their pivotal role in tumor progression.

Funding:

Work funded by FCT-Foundation for Science and Technology (UIDB/04567/2020 and UIDP/04567/2020)

Posters

Session I

P1 3D-QSAR, pharmacophore modeling, and molecular docking for the identification of novel potential P-glycoprotein (P-gp) blockers

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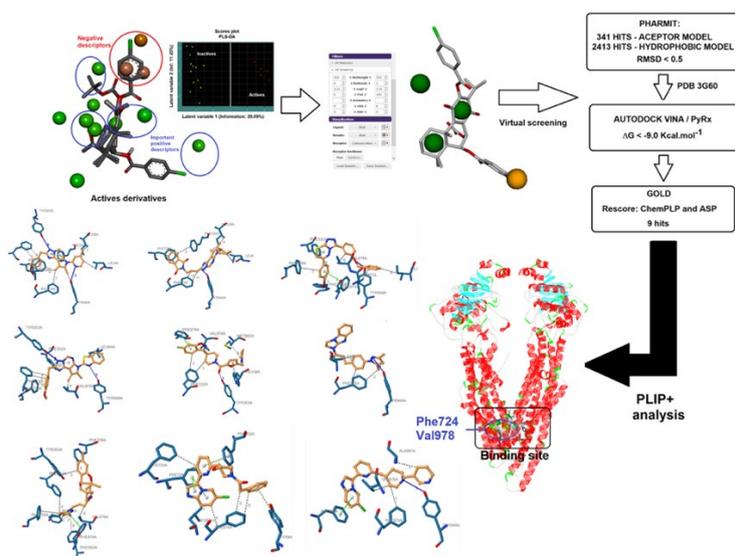
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Using a series of royleanones derivatives [1] studied as P-gp blockers (5 active and 13 inactive compounds), a 3D-QSAR model was constructed. This model employed Molecular Interaction Fields (MIF) descriptors calculated through the LQTA-QSAR approach and classification by Partial Least Squares with Discriminant Analysis (PLS-DA). The model was capable of discriminating the derivatives, aiding in the proposition of a pharmacophore model utilized in the PHARMIT web tool for screening in the ZINC database. The identified compounds underwent an initial molecular docking step using Autodock Vina. Hits with $\Delta G < -9.00$ Kcal.mol⁻¹ were then subjected to a second docking step in GOLD, where a consensus study was conducted using the ChemPLP and ASP algorithms. By employing the obtained scores of the co-crystallized inhibitor as a lower limit in both methods, nine derivatives were selected, all of which exhibited higher scores than the co-crystallized ligand for both algorithms. Analysis of the interaction network revealed that, among the interactions formed, most of the derivatives established several hydrophobic interactions with Phe724 and Val978, two critical residues for drug binding. The results obtained are promising, and further molecular dynamics studies will help determine which of these hits are the most promising for inhibiting P-gp.



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Funding: Fundação Araucária; UIDB/04567/2020; UIDP/04567/2020

P2 A triazole derivative inhibits Lysyl oxidase like 2 and changes breast cancer cells migration

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P3 Adherence to the Mediterranean Diet among Portuguese health professionals

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The Mediterranean Diet (MD) is recognized as a healthy and sustainable diet that has several health benefits playing a protective role in the development of chronic non-communicable diseases. Some health professionals work in rotational shifts, which can disrupt their circadian rhythm and lead to changes in dietary habits [1-4]. A cross-sectional observational analysis was carried out to assess MD adherence in a sample of Portuguese health professionals. The study involved 35 individuals who answered a questionnaire in digital format that included questions about the consumption and frequency of food consumption considered characteristic of the MD based on the PREdiMED (PREvención com Dieta MEDiterránea) protocol in which each question is scored from 0 to 14 [5,6]. Adherence was classified as low if the score was less than or equal to 5, medium adherence if the score was between 6 and 9 and high adherence if the score was equal to or greater than 10. Questions were also asked about the average number of extra hours/shifts worked each month and during the night. More than half of the participants in the current study worked during the night time. Nutritionists showed the highest MD adherence compared to other health professionals. The current study has shown that even though more than half of the participants did work at night and did extra shifts or extra hours, this did not exert influence on the adherence to the MD.

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P4 Adherence to the Mediterranean Diet of a sample of Portuguese over 60 years old.

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Summary: The Portuguese population is aging, therefore there is a heavy prevalence of hypercholesterolemia, cardiovascular diseases, and diabetes^{1,2}. With the intent of minimizing the risk of chronic diseases and raising the quality of life of our elderly it is crucial that healthier food patterns are adopted, like the Mediterranean Diet (MD).³ The objective of this study was therefore to analyze if the elderly adhere to the MD and understand if its notoriety had an impact on that decision. The analyzed sample consisted of 67 individuals (53 women and 14 men), interviewed in-person and was conducted utilizing the PREDIMED questionnaire, whose final score varies from 0 to 14. The results obtained suggest that despite the benefits shown by this pattern, most of the sample (60%) shows a moderate adherence to the MD. The low weight, the knowledge of this pattern, retirement, and higher education can influence positively the elderly to adhere to the diet, however, it's important to emphasize that statistically there wasn't a significant difference in the results. Finally, it was easy to see that the main barriers to adhering were the low intake of vegetables, legumes, olive oil, wine, and seafood.

Key-words: Mediterranean Diet; elderly; literacy

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P5 Adherence to the Mediterranean Diet, Stress and Eating Self-efficacy in Higher Education students in Portugal

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The Mediterranean Food Pattern (MFP) is characterized by a high intake of non-processed foods (e.g., fruit and vegetables), moderate intake of dairy products, preferential intake of fish or lean meat, regular consumption of wine and use of olive oil. MFP is associated with a reduction in the incidence of chronic and neurodegenerative diseases and a longer life expectancy [1]. When students begin their academic journey, they are subject to several changes (psychological, environmental, and economic, among others), which may have implications for their eating habits [2]. This could lead to a withdrawal from the MFP, with implications for students' health [3]. The purpose of this study is to evaluate the relationship between adherence to the MFP, nutritional status, dietary self-efficacy, and the level of stress in higher education students in Portugal. This study is cross-sectional in nature and data collection took place between May and June 2023, through an online questionnaire. One hundred fifteen higher education students participated in this study, the majority of whom were female (68.7%), with a median age of 23 years (range between 20 and 28 years). The results revealed that as body mass index (BMI) increases, age also tends to increase ($p=0.003$; $r: 0.273$), and as adherence to the MFP increases, food self-efficacy also tends to increase ($p=0.003$; $r: 0.273$). No significant correlations were found between the other variables studied. When students feel stressed, they tend to consume more sweet foods and fast food, while reducing their consumption of fruits and vegetables. Based on the correlations established between BMI, adherence to the MFP, perceived stress and eating self-efficacy, it can be concluded that the higher the BMI and adherence to the MFP, the greater the eating self-efficacy. These results offer valuable insights that can be explored in future dietary interventions targeting this population group.

Acknowledgments:

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P6 An alternative assessment of the antioxidant activity of rutin: using HPLC-TBARS-EVSC

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Introduction: Oxidative stress caused by the frequent unprotected exposure of skin to solar radiation in an excessive formation of reactive oxygen species, a phenomenon that represents one of the factors responsible for causing inflammation, premature aging and skin cancer development. The use of bioactive compounds with potential antioxidant and anti-inflammatory activity is an efficient care to aid in skin homeostasis and combat the solar radiation harmful effects [1]. Rutin is well known for its antioxidant capacity, but most reports in the literature are based on in vitro methodologies, such as DPPH or FRAP methods. We aimed to probe *ex vivo* the efficacy of rutin as an inhibitor of the formation of lipid peroxide species through ultraviolet radiation (UVR) on the human stratum corneum (SC). Materials and methods: On the volar forearms of volunteers, four regions were defined. Aqueous gel (AG) was applied to two regions, and AG + 0.1% rutin on the other two at a dose of 2.0mg/cm² [1]. After 2 h of application, six adhesive tapes per region were used to obtain SC from the subjects, being irradiated at 5506 KJ·m⁻² in a solar simulator chamber. The SC extraction from the tapes was performed by adding 10 mL of methanol and the lipid peroxidation was determined by the HPLC-TBARS-EVSC protocol [2]. Results and Discussion: The assay allowed the quantification of the lipid peroxide species of the SC formed by artificial UVR. Non-treated SC had an expressive augment of the lipid peroxidation profile. The sample containing the active (AG + 0.1% rutin) attenuate the SC lipoperoxidation, indicating a protective activity of rutin against URV by mitigating the cutaneous oxidative stress.

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P7 Antiglioblastoma potential of *Plectranthus* spp. isolated diterpenes

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Lamiaceae is a commercially important family of flowering plants comprising around 250 genera and 7825 species, being many of them used in folk medicine and modern industries alike. Their ability to produce complex mixtures of bioactive secondary metabolites has contribute to make them a valuable source of ingredients for pharmaceutical industry.

One of the members of this family, is the *Plectranthus* genus, known to be rich in bioactive diterpenes abietane-type royleanones, such as 7 α -acetoxy-6 β -hydroxyroyleanone (Roy), 7 β ,6 β -dihydroxyroyleanone (DiRoy) and Parviflorone D (ParvD). Roy and DiRoy are frequently found in the extracts of the species *P. hadiensis* whereas ParvD is found in *P. ecklonii*. These compounds can be considered as lead molecules to develop new treatments against glioblastoma (GB) regarding their previous demonstrated pro-apoptotic nature in H7PX cells. In our research group, the bioguided isolation from *P. hadiensis* stems acetonic extract was carried out resulting in the obtention of Roy and DiRoy, which were the major compounds according to the HPLC-DAD profile of the extract. Among these compounds, Roy showed low IC₅₀ values among the different glioblastoma cell lines (U87, A172, U118, U373 and H4) in the Alamar blue assay. The uptake of the probe derivative BODIPY-Roy by GB cells increased intracellular fluorescence, supporting the strong antiproliferative effects of Roy. Also, the ParvD diterpene mechanism isolated from *P. ecklonii* whole plant extract exerts pronounced inhibitory effects (with substantially lower doses than that of Temozolomide, the current first-line treatment) involving intrinsic apoptosis and G2/M cell cycle arrest. Currently, the study of the extraction optimization of these bioactive compounds and the study of the *in vivo* mechanism of action is on-going, in order to explore the huge potential of these diterpenoids and their derivatives to be used as a helpful source of new drugs to improve GB treatment and to overcome resistances.

Acknowledgments:

This work was supported by FCT-Foundation for Science and Technology, through UIDB/04567/2020, UIDP/04567/2020, UIDB/04539/2020, UIDP/04539/2020 and LA/P/0058/2020 projects. E.M.D.-M. gratefully acknowledges being the recipient of a predoctoral FPU 2019 fellowship from University of Alcalá. MM is supported by a Foundation for Science and Technology (FCT) PhD grant (Reference: SFRH/BD/146441/2019). This PhD grant is financed by national budget and co-financed through the European Social Fund (ESF) and the Regional Operational Por_Centro.

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P8 Antimicrobial activity of a peptide fraction derived from *Wickerhamomyces anomalus* metabolism against fruit juices pathogens

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Nowadays, the food industry uses mainly synthetic preservatives to guarantee microbial spoilage reduction, avoid nutritional and chemical changes in food products, and prolong their shelf life [1]. However, the increasing consumer interest in healthier foods, without synthetic preservatives, is pressing food industries to develop less processed and more natural products [2]. Various pathogenic microorganisms, such as *Escherichia coli*, *Listeria monocytogenes* and *Salmonella spp.*, represents a risk of contamination to food products [3-5]. Numerous bioactive metabolites with antimicrobial activity, including antimicrobial peptides, bacteriocins, and mycocins, have been identified [6]. *Wickerhamomyces anomalus* is a yeast with potential applications in the food industry due to its antimicrobial properties [7]. Therefore, the aim of this work is to evaluate the efficacy of a peptide fraction obtained from *W. anomalus* metabolism against *E. coli* (ATCC® 25922), *L. monocytogenes* (ISA 4008) and *Salmonella spp.* (ISA 4008), common contaminants in fruit juices.

The microdilution method was used to determine the minimum inhibitory concentration (MIC). The findings revealed that within the peptide fraction 2-10 kDa, MIC of 2300 µg/mL was observed against both *E. coli* and *L. monocytogenes*, while against *Salmonella spp.* exhibited an MIC of 1150 µg/mL. These results provide compelling evidence of a potential antimicrobial effect, warranting further in-depth exploration and analysis. A challenge test was then conducted to assess the antimicrobial activity of the peptide fractions in fruit juice at 0, 24 hours, 7 days, and 14 days, and cultured in selective media. The results demonstrated that the peptide fraction tested was highly effective in inhibiting the *E. coli* strain, resulting in a reduction of more than 5-log CFU mL⁻¹ after 7 days of continuous growth. These findings suggest that the peptide fraction obtained from *W. anomalus* metabolism can be apply as an antimicrobial agent for application in fruit juices.

Acknowledgements:

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P9 Antimicrobial activity of two mycocins produced by *Wickerhamomyces anomalus* for the preservation of cosmetic formulations

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The increasing consumer's interest in natural cosmetics, without synthetic preservatives, more eco-friendly and the industry's intense search for options that can ensure the safety and health of consumers, has become a constant challenge [1]. In response, the application of natural preservatives such as bioactive metabolites produced by microorganisms emerges as a compelling alternative strategy to develop natural and more safety cosmetics. For instance, *Wickerhamomyces anomalus* yeast has demonstrated the ability to produce antimicrobial peptides (mycocins) that have been shown their potential applications in preservation of wine and other food products [2]. Therefore, the aim of this work is to evaluate the antimicrobial activity of a peptide fraction obtained from *W. anomalus* metabolism against some of the microorganisms considered pathogenic in cosmetic industry: *Bacillus cereus*, *Staphylococcus epidermidis*, *Staphylococcus pyogenes*, *Staphylococcus aureus*, Methicillin-resistant *Staphylococcus aureus* (MRSA), *Pseudomonas aeruginosa*, *Escherichia coli*, *Streptococcus mutans*, *Streptococcus mitis*, *Candida albicans* and *Aspergillus niger*. with this purpose, minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) of two peptides fractions, 2-10 kDa and > 10 kDa derived from *W. anomalus* metabolism were determined against the microorganisms mentioned above. The MIC results showed that most of the microorganisms under study were sensitive to the peptide fraction, particularly to the > 10 kDa peptide fraction, showing very promising results against *Staphylococcus aureus*, *Bacillus cereus*, MRSA, *Escherichia coli*, *Streptococcus mutans* and *Candida albicans*. The MBC test showed that most of the microorganisms analysed only revealed bacteriostatic action. Therefore, this research showed that the peptide fraction under study proved to be effective in reducing cosmetic microbial contaminants, which could be a first step to integrate this fraction into cosmetic products as natural preservative.

Acknowledgements:

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P10 Assessment of chemical profile, cytotoxicity, and inhibition of osteoclast differentiation by Cõa Valley plant extracts

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Osteoclasts are specialized cells in bone resorption with robust and active mitochondria. RANKL is essential for osteoclast differentiation and activation, including promoting the production of reactive oxygen species (ROS) involved in osteoclast formation and function. The decline in estrogen levels during menopause increases susceptibility to osteoporosis. Current therapies for osteoporosis have limitations, necessitating the development of safer and more accessible alternatives. In this study, we obtained decoction and ethanolic maceration extracts from plants indigenous to the Cõa Valley (*Equisetum ramosissimum* Desf. (ER), *Urtica dioica* L. (UD), *Urtica urens* L. (UU)) and explored their potential for treating osteoporosis. Through LC-DAD-ESI/MSn phenolic compound analysis, flavonoid and phenolic acids were identified in the extracts. Plant extractions were performed, their chemical composition analysed, and their antioxidant activity assessed. Subsequently, the extracts cytotoxicity was evaluated to gain insights into their inhibitory effects on osteoclast differentiation. Using RAW 264.7 cells exposed to aqueous and ethanolic extracts at concentrations ranging from 1 mg/mL to 0.063 mg/mL over a 5-day period, we observed a decrease in cell metabolic activity when cells were exposed to decoction extracts from all plant species, which can be hypothesized to stress conditions. Conversely, the ethanolic extracts demonstrated no cytotoxicity until 1 mg/mL for ER and UD, and for UU, no toxicity was observed with concentrations up to 0.125 mg/mL. Preliminary data suggest that these extracts inhibit osteoclast differentiation and influence mitochondria activity. Ongoing research aims to further explore the inhibitory effects of these extracts and elucidate their mechanisms of action to identify the chemical compounds responsible for the bioactivity.

Acknowledgments:

We would like to thank the financial support provided by Foundation for Science and Technology (FCT, Portugal) through the following projects: UIDB/04539/2020, UIDP/04539/2020, LA/P/0058/2020 (CIBB), UIDB/04567/2020, UIDP/04567/2020 (CBIOS) Strategic Projects and CõaMedPlants (COA/BRB/0019/2019)

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P11 Assessment of nutritional knowledge in kindergarten teachers and pre-school children and its impact on the frequency of children's food intake

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Nutrition plays a fundamental role in human evolution, growth and development, and the food choices that each individual makes are closely linked to the knowledge acquired in the area of food and nutrition [1]. Through a descriptive, cross-sectional observational study of a quantitative nature, the aim was to use a questionnaire to assess the knowledge of pre-school children and their educators in the area of food and nutrition, as well as the children's eating habits; to relate the educators' knowledge to that of their children and to assess the prevalence of childhood obesity. The data was collected in a single moment, at the *Santa Casa da Misericórdia de Mafra* school, and to assess anthropometric parameters, the body weight (Kg) and height (m) of a sample made up of 7 kindergarten teachers, all female, and 105 children (58 female and 47 male) between the ages of 3 and 7 were taken. The results showed that educators with a high level of knowledge in the area of nutrition do not pass this on to the children in their classrooms. When comparing the children's knowledge according to gender, it can be concluded that there is a slightly higher percentage of females. Some of the studies [2-4] analyzed corroborate this premise. When the children's BMI categories were assessed, contrary to expectations, it was found that there were no significant differences between the sexes in the different BMI categories (P-value = 0.472), which does not coincide with the literature, since the prevalence of obesity is higher in males. [5] The prevalence of childhood obesity was 13.30%.

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P12 Chemical analysis and nutritional profile, health impacts, safety and quality control, and food Industry applications of agave syrup

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A popular vegan alternative to common sweeteners like sucrose is agave syrup (AS), a food product developed from the sap of the agave plant [1,2]. Since there has been an increase in the demand for naturally derived sweeteners over the past ten years [3], this narrative review addresses and discusses in detail the most pertinent aspects of the chemical AS analysis, applications in the food industry, sustainability issues, safety and quality control, and, finally, nutritional profile and health impacts. We may suppose that the mid-infrared-principal components analysis, high-performance anion exchange chromatography with a pulsed amperometric detector, and thin-layer chromatography can be employed to identify and discriminate syrups from natural sources in light of our main research findings. Bagasse, juice, leaves, and fiber are the primary agave-derived products. The most environmentally friendly options on the market, in terms of sustainability, are free trade and certified organic agave products, which ensure that the items in question were produced without pesticides and in accordance with established labor standards. Additionally, the Mexican government and AS manufacturers have developed regulations that forbid the use of any component, sugar, or food additive that derives from sources other than agave plants in the production of any commercial AS. Compared to other conventional sweeteners, AS is an excellent source of minerals, vitamins, and polyphenols because of its nutritional value. To support AS's health claims as a natural sugar alternative, additional research into how it affects human metabolism is required.

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P13 Classification of molecules' interaction with ABC transporters

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Multidrug resistance (MDR) acquired by cancerous cells has been a critical hurdle in chemotherapy. The ABC transporter protein family is related to an increased efflux of drugs during treatment, taking part in MDR. [1] Therefore, modulator molecules with the capacity to interact with these proteins, reducing this efflux, have been a great topic of research.

With this in mind, we developed Machine Learning models for prediction of a molecules' modulatory activity with P-glycoprotein (P-gp), multidrug resistance-associated protein 1 (MRP1) and breast cancer resistance protein (BCRP). These ABC transporters are known as the efflux triad responsible for MDR in cancer. These models could aid research efforts toward discovery of the modulatory activity of new molecules of interest.

For the creation of the models, we collected datasets from ChemBL database concerning molecules with modulatory activity for P-gp, MRP1, BCRP, which were manipulated using Python. These molecules were classified either as active or inactive given their IC₅₀ values and their characteristics were described using Morgan RDKit fingerprints (radius=2, roughly equivalent to ECFP4 and FCFP4). This data was used to train various Machine Learning models, deployed with the PyCaret library, which allowed for subsequent testing and performance analysis. Based on these results, the best performing models were chosen and tuned. Given that PyCaret has a Feature Importance Plot, additionally, for each chosen model we were able to observe the most relevant fingerprints for model prediction.

As a result of this process, Machine Learning models with accuracies of 0.82, 0.90 and 0.84 were obtained for P-gp, MRP1 and BCRP, respectively. Some of the fingerprints that were pointed as having the highest importance in each model corresponded to molecular groups already described in literature as being relevant for modulatory activity against each transporter, reinforcing the quality of the models for bioactivity prediction. [2,3]

Acknowledgments.

Project ILIND Seed Funding CoSysCan: *Combining Synergistic Approaches to Fight Cancer* (COFAC/ILIND/ CBIOS/1/2021) is acknowledged for funding.

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P14 Cleomiscosin B: A potent coumarinolignoid exhibits promising antagonist inhibition of phosphodiesterase-5: Rationale of usage *Paullinia pinnata* L. (Sapindaceae) in the management of erectile dysfunction

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Sexual dysfunction is a societal aberration common among men of different ages, but predominantly among older men. The usage of *Paullinia pinnata* (PP) in the management of erectile dysfunction among locals in Southern Nigeria is a common practice due to the several limitations associated with the conventional medicines that are utilized in the treatment of MSD. The study aims at unfolding the aphrodisiac bioactive principle(s) in PP and their mechanistic insight.

The *in vivo* aphrodisiac potential of PP was carried out using the method described by Adedokun *et al.*, (2022) and Yakubu *et al.*, (2011) while the unveiling of the probable mechanism was done using molecular docking as well as molecular dynamic simulation (AMBER18).

A dose-dependent increase in serum cholesterol was observed in PP with 50.67 ± 9.77 mg/dL and 111.30 ± 41.88 mg/dL at 50 and 200 mg/kg, respectively. Improved activity was observed in dichloromethane fraction (DCMPP) with serum cholesterol of 77.00 ± 10.17 and 127.56 ± 21.54 mg/dL at 50 and 100 mg/kg, respectively relative to negative control $p \leq 0.05$. A dose-dependent increase in serum testosterone was likewise noted for PP ($3.21 \pm 0.58 - 5.33 \pm 1.01$) while DCMPP showed 2.25 ± 0.17 and 5.33 ± 1.01 ng/dL at 50 and 100 mg/kg, respectively relative to 2.51 ± 0.12 ng/dL of testosterone observed for negative control (distilled water) at $p \leq 0.05$. Moreover, mount and intromission frequencies also increase with doses for PP and DCMPP relative to the negative control (distilled water) at $p \leq 0.05$ while ejaculation frequency reduced with doses. Also, Cleomiscosin B was noted to exhibit an inhibitory potential against the PDE-5 receptor (binding affinity; 9.280) among all the compounds examined, with improved RSMD, RSMF, and RoG. Covalent, hydrogen, and pi-interactions were observed between the pharmacophores of Cleomiscosin B and some amino acids residues in the catalytic site of PDE-5.

Cleomiscosin B might be the bioactive principle in PP, hence the usage in the management of penile erectile dysfunction in South Western Nigeria.

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P15 Composition of school lunch boxes for children aged between 7 and 9 years old

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Break meals are essential to regulate appetite between the main meals and influence brain functioning, concentration and school performance, being even more prone to eating errors [1-5]. In this way, political strategies for food intervention were defined with recommendations for the preparation of healthy snacks [1].

This cross-sectional analytical observational quantitative study, which aim consisted in characterizing the composition of the morning and afternoon snacks prepared by the guardians (EE) of children between 7 and 9 years old verifying whether their composition fulfilled all the requirements of the checklist on the 2021 Guide for Healthy School Snacks from the General Directorate of Health and the General Directorate of Education (GLSE), is based on an online follow-up that included sociodemographic questions from the EE and students, as well as closed questions based on the GLSE checklist. The data collection took place between 18th and 24th of October 2022, with a total of 32 EE that prepare snacks.

The composition of school snacks always included cereals and derivatives (56.30%), milk and derivatives (78.10%) and fruit (75.00%), absent fatty and oleaginous fruits (56.30%), vegetables (81.30%), legumes (93.80%) and eggs (59.40%). It was verified with this study that the majority of the EE (71.88%) revealed that the composition of the afternoon snacks was different from those in the morning. Most EE did not meet all the requirements of the GLSE checklist (87.50%), although they considered the composition of their students' snacks healthy.

These results validate the conclusions of other studies that demonstrated that the snacks taken by children to school do not always comply with food recommendations, due to lack of availability and information from the EE that prepared them, offering foods with high energy density [1,2,5-9].

Acknowledgments:

The authors acknowledge all the collaborators and participants involved in the study.

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P16 Design of a new DNA-FISH probe for the rapid identification of *Candida albicans* in food and cosmetic products

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The microbiological control of pathogens that can contaminate cosmetic and pharmaceutical products is essential for protecting consumer health. Traditional microbial detection methods, such as inoculation by plating on selective media, remain the most applied in the food, pharmaceutical, and cosmetic industry [1]. However, these methods can be very time-consuming and sometimes prove to be inaccurate in the identification of microorganisms. On the other hand, molecular methods, such as polymerase chain reaction (PCR)-based assays and FISH (Fluorescence *in situ* hybridization) technique can rapidly detect microorganisms in contaminated samples providing rapid quality control analysis [2]. FISH is a culture-independent method that allows the specific identification of microbial species at the single-cell level by using fluorescently labelled probes that hybridize specifically with the complementary RNA or DNA sequences within the target cells [3]. In order to identify in a faster way, the presence of contaminant microorganisms such as *Candida albicans* in cosmetics and pharmaceutical products, a new DNA-FISH probe was designed *in silico*, as described in Branco et al., (2020) [4]. The probe hybridization efficiency and specificity were tested applying an in-suspension RNA-FISH protocol coupled with flow cytometry (flow-FISH) to *C. albicans* (target) as well as to non-target yeasts (*S. cerevisiae*, *Candida krusei* and *Wickerhamomyces anomalus*). The results showed a low percentage of non-target hybridized cells, i.e., 2.3%, 1.9% and 4.7% of *S. cerevisiae*, *W. anomalus* and *C. krusei*, respectively, with low fluorescence intensity (FI). Conversely, a high percentage (98.9%) of *C. albicans* hybridized cells with a high FI (25000 (a.u)) was detected by flow-FISH with 0% of formamide. This compound is commonly applied in FISH assays to adjust the stringency conditions. However, considering its toxicity [5] its application must be avoided. In conclusion, the new probe showed to be specific for *C. albicans*, both *in silico* and experimentally. This study contributes to the future implementation of a fast methodology to detect *C. albicans* in food or cosmetic products.

Acknowledgements:

The authors thank to School of Engineering, Lusófona University and to Elisa Câmara, Lda for the financial support of this work.

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P17 Determinants of preference for fast food among higher education students in Portugal

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The consumption of fast food is a public health concern because it is associated with an unhealthy diet, as well as the risk of certain chronic diseases such as obesity, cardiovascular disease, diabetes, among others [1]. The frequency of fast food consumption among higher education students is high, with significant implications for public health [2]. This study aims to analyze the factors influencing the choice of fast food, considering social variables, nutritional status, and consumption patterns among higher education students in Portugal. An online questionnaire was designed and widely disseminated on social media, targeting students during the first semester of 2023. In total, 237 students participated in the research, with a majority being female (65.4%). Most of these students attended public higher education institutions (59.1%) and had a median age of 20.0 (19.0; 22.0) years. Approximately 20% of these students were overweight. It was observed that about 80% of participants consumed fast food, with almost 40% doing so once a week or more. Burgers were the most popular choice (78.0%), with an average cost of €8.0 per meal. The primary factors influencing the selection of fast food were ease or practicality in preparation (59.9%), price (48.5%), and taste (28.3%). Additionally, this study examined differences in dietary habits between sexes and among students at public and private higher education institutions, as well as between regular consumers of fast food and non-consumers. A positive correlation was found between body mass index and age ($r: 0.142$; $p = 0.029$) and between body mass index and expenditure on fast food ($r: 0.146$; $p = 0.024$). The findings of this study have significant implications for public health and clinical nutrition practice. They provide valuable insights that can underpin the development of more effective strategies to enhance the dietary choices of higher education students.

Acknowledgments.

This study was supported by the Fundação para a Ciência e Tecnologia (FCT) through the CBIOS projects UIDB/04567/2020 and UIDP/04567/2020.

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P18 Development of gels incorporating nanoemulsions based on *Hermetia illucens* larvae extract: stability and skin compatibility studies

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Innovative cosmetic formulations composed of natural and sustainable ingredients are at the forefront of consumer demand. The aim of this work was to develop sodium alginate and Aristoflex® AVC gels containing nanoemulsions (NEs) based on the lipids extracted from the biomass of *Hermetia illucens* larvae. NEs were characterized in terms of size, polydispersity index (PDI), and zeta potential (ZP); and stability tests were carried out on the gels, assessing viscosity, pH, and organoleptic characteristics over 30 days of storage at room temperature. The skin compatibility of the gels was also evaluated using the *Open application test* – assessing the following parameters: skin hydration, transepidermal water loss (TEWL), and erythema – and the *Patch test*. About the characterization of the NEs, the size was adequate for skin applications, the PDI was indicative of homogeneity in the size distribution and the ZP suggested reasonable colloidal stability. No changes were observed over time in the parameters evaluated during the stability tests of gels. When assessing the skin compatibility of both gels, the *Open Application Test* showed that the skin parameters assessed after gel application had no significant differences compared to the control. In the *Patch Test*, none of the gels caused redness, erythema, or any other skin alteration, indicating a good safety profile for the application of these formulations on the skin.

Acknowledgments:

This research was funded by FCT - Foundation for Science and Technology, I.P. through national funds under the UIDB/04567/2020, UIDP/04567/2020, and EXPL/BTM-MAT/0112/2021 projects attributed to CBIOS. The authors also thank Entogreen® for kindly supplying the *Hermetia illucens* larvae.

P19 Evaluation of food labels knowledge in a sample of Portuguese adults

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The correct reading of food labels (FL) plays a crucial role in the adoption of a healthy diet, which is one of the main factors in preventing chronic diseases¹. This cross-sectional observational study aimed to assess the knowledge and perception of Portuguese adults regarding reading and interpretation of FL and to determine the factors that influence them. For that, a three-group questionnaire was created: a) sociodemographic variables; b) a FL reading survey; c) determination of the participant's level of FL reading, which was classified as "insufficient", "average" or "good". This study included a sample of 301 Portuguese adults with an average age of 41,00 years (18 to 82 years), of which the majority were female (70,40%). It was possible to conclude that most participants had an average or insufficient FL reading level (55.48%), and there were positive associations between a higher FL reading level and female gender ($p=0.041$), normal weight ($p=0.028$), age below 60 years old ($p<0.001$), higher education ($p=0.001$) and healthcare professional ($p<0.001$). It was also found that most participants with an "insufficient" reading level do not consult food labels ($p<0.001$), find them difficult to interpret ($p=0.016$), consider them unimportant ($p<0.001$), and feel that they interpret them incorrectly ($p<0.001$). In conclusion, reading food labels can be influenced not only by sociodemographic variables, such as gender, weight, age group, level of education, and professional area but also by consultation habits, ability to interpret food labels and the importance attributed to them.

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P20 Evaluation of Phenolic compounds, Antioxidant and Anticholinesterase Activities of some medicinal plants

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Tunisia offers a rich source of medicinal plants for a wide range of many illnesses. In addition to their traditional uses, medicinal plants are a source of new natural molecules isolated.

This work main to valorize some Tunisian medicinal plants: *Globularia alypum* L, *Thymelea hirsuta* L, *Nicotiana glauca*, *Teucrium polium*, *Marrubium alysson* L., in order to enhance their value and discover new bioactive.

The present study aims to evaluate the biological activities (antioxidant and enzymatic) and phenolic compound contents (polyphenols, flavonoids, flavonols) of the extracts of the selected species.

The in vitro antioxidant activity of the different extracts was investigated by the DPPH and ABTS radical scavenging assays and the ferrous ion chelating ability. The phenolic compounds (total polyphenols, flavonoid, flavonol) were evaluated by spectrophotometric methods. Acetylcholinesterase AChE inhibitory activities were carried out following the method described by Eldeen et al. [1] with some modifications.

Flavonoid and flavonol contents show that *Teucrium polium* extract (aerial part) is the richest extract with contents of 11.77 mg ER/gE and 3.83 mg EQ/gE, *Globularia alypum* flower extract has the highest polyphenol content polyphenols (7.09 mg EAG/g E).

Antioxidant activity results show that: *Teucrium polium* stem extract has the highest antioxidant activity: 169.9 mg ET/gE for the DPPH test and *Nicotiana glauca* extract (leaves) 165.47 mg TE/gE for the ABTS test. The chelating capacity shows that *Teucrium polium* aerial extract has the highest highest activity (6.68 mg eq EDTA/gE).

For the acetylcholinesterase inhibitory activity, the extract of *Globularia alypum* flower : 276 ug eq donepezil /g extract revealed the most important activity and the lowest activity the lowest in *Globularia alypum* leaf extract (4.33 ug eq donepezil /g extract).

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P21 Exploring the impact of TMBIM Proteins on glioma: insights from tumour expression patterns and cellular functional studies

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P22 Identification and characterization of contaminants of food contact materials and associated risks: Analysis of the reports published in RASFF portal from 2020 to 2022

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Food Contact Materials (FCM) have been a source of alert and concern for public health. The portal of Rapid Alert System for Food and Feed (RASFF portal) is a key tool for food safety that includes the countries of the European Union, together with a few associated countries. This system ensures the flow of information to enable swift reaction when risks to public health are detected in the food chain. The present work aimed at characterizing the RASFF notifications related to FCM that occurred between the period of January 2020 and December 2022.

A search was performed in RASFF database, selecting the filter "Product- food contact material" between the period of 1 January 2020 to 31 December 2022. The retrieved data set was directly downloaded in Excel format, and descriptive statistical methods were applied. A total number of 600 notifications was obtained with the application of these criteria. The results of this study demonstrate that tableware, followed by cooking utensils and cups/mugs, are the product categories that originated the greatest number of notifications. Primary aromatic amines were the contaminant associated with higher health risks and physical particles were the most reported contaminants. China was the country of origin most associated with notifications and Spain was the country that carried out most notifications. The results of the present study demonstrate that there are still some products with a highest risk of contamination, such as tableware, cooking utensils and cups/mugs. Many notifications report contamination with melamine, with values higher than those allowed by the EU and member countries that contribute to the RASFF portal. In conclusion, the safeguard of public health from FCM-related hazards justifies the length and scope of scientific and legislative consideration that food has gathered thus far, for the benefit of consumers' health.

P23 Inflation Impact on Portuguese Eating Choices

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The occurrence of the COVID-19 pandemic and the war in Ukraine has led to a worsening of the global economy and consequently triggered inflation¹⁻⁴. In Portugal, increasing food inflation could compromise the population's health, as the price is a determining factor during food choices^{5,6}. This study is classified as observational, descriptive, and cross-sectional, to evaluate the impact of inflation on the diet of the Portuguese population. An online questionnaire was created, with a sample of 238 participants aged between 18 and 77 years. In this study, it was observed that there was a decrease in fat consumption. Most of the families who reduced their consumption of cereals, meat and eggs, fish, and dairy products belonged to the intermediate income group. Regarding the consumption of vegetables, legumes, and fruits, the majority of participants maintained their consumption. When purchasing food, nutritional quality was the main contributing factor, followed by price. In this analysis, it is possible to conclude that inflation has a direct consequence on the dietary decisions of the Portuguese population, potentially having long-term negative impacts on diet quality and lifestyle.

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Session II

P24 Integrative multi-omics approach for pancreatic islet cell reprogramming into insulin producers

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Diabetes is one of the most common metabolic disorders affecting millions of people worldwide. Despite the diverse etiology of different diabetes forms, insulin deficiency and resistance associated with the loss of pancreatic β -cells represent common pathophysiological mechanisms. In recent years, the transdifferentiation of pancreatic α -cells into insulin producers has gained attention as a potential strategy to increase insulin production. Hence, a deeper understanding of the molecular triggers of α - to β -cell-like transdifferentiation and the search for strategies to modulate it open new venues for the development of novel therapeutic options for diabetes management. The goal of this study was to explore existing multi-omics datasets associated with powerful bioinformatic tools to identify molecular targets associated with α - to β -cell-like transdifferentiation. A comprehensive search of the literature for human studies on gene expression alterations in the pancreas associated with type 1 or type 2 diabetes was performed. Six studies were analyzed for pathway enrichment of differentially expressed genes, together with a protein-protein interaction network, and the identification of potential regulating transcription factors (TFs) was performed. Regulatory non-coding RNAs (ncRNAs), particularly microRNAs (miRNAs) and long non-coding RNAs (lncRNAs), are fundamental for establishing robust networks. Thus, differently expressed ncRNAs were analyzed and their targets were identified. Integrated analysis of protein-coding genes, miRNAs, and lncRNAs pointed out several pathways involved in metabolism, cell signaling, inflammation, cell adhesion, and interactions. Interestingly, the GABAergic synapse pathway emerged as the only common pathway to all omics. The regenerative capacity of γ -aminobutyric acid (GABA) has been studied in conditions of β -cell depletion, where GABA seems to contribute to the transdifferentiation of α -cells into β -cells. This study demonstrated the power of bioinformatics tools for the integration of publicly available transcriptomics data allowing the identification of potential therapeutic targets.

Acknowledgments:

FCT-Foundation for Science and Technology, I.P. (Portugal), under the [UIDB/04567/2020] and [UIDP/04567/2020] projects. R.M. and A.G. are funded by FCT Scientific Employment Stimulus contracts [reference numbers CEEC/04567/CBIOS/2020 and CEEC/CBIOS/2-2023, respectively].

P25 Ionic Liquids as Efficient Sorbents for Chemical Warfare Agents

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The Chemical Weapons Convention (CWC), was the World's first multilateral disarmament agreement that prohibited the development, production, and storage of CWAs (chemical warfare agents), however occasional reports of their use still persist in certain countries. In the event of a CWAs attack, swift response actions are critical to mitigate casualties. In such scenarios, a prompt detection and identification of the CWAs is imperative, as is the thorough decontamination of materials, personnel, equipment, and of the affected area. Several CWAs decontamination methods have been reported and the majority use bleach-based decontaminants for their cost-effectiveness and broad-spectrum efficacy. Unfortunately, these decontaminants present several drawbacks, such as potential surface corrosion, toxicity to human health, and environmental harm.[1-2]

This work introduces an innovative approach to CWAs decontamination, by studying novel materials based on Ionic Liquids (ILs). ILs are described as salts in a liquid state that present interesting properties such as having a negligible vapor pressure at relatively ambient conditions, a high thermal, chemical, and electrochemical stability. Largely made of ions they present promising potential applications/uses, such as “green” solvents, as electrolytes, in catalysis, for carbon capture, in pharmaceutical and biological areas, amongst numerous other applications.[3] In our study these materials demonstrated the ability to adsorb and absorb CWAs from contaminated surfaces or the atmosphere into their structure. As a proof of concept, several ILs were synthesized and rigorously tested as sorbents for CWAs simulants, revealing not only remarkably high sorption rates but also a high degradation efficiency.

Acknowledgments.

This research was sponsored by NATO Science for Peace and Security Programme under grant G5713. The authors also show appreciation to Fundação para a Ciência e Tecnologia (FCT) (Ref.UIDB/04138/2020, UIDP/04138/2020, UIDB/04567/2020 and UIDP/04567/2020, and EXPL/OCE-ETA/1109/2021) for the financial support.

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P26 Long non-coding RNAs as potential biomarkers associated with pancreatic β -cell failure in diabetes

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Diabetes is one of the most prevalent chronic diseases in the world and it has been growing exponentially over the years. This metabolic disorder is characterized by a state of hyperglycemia, and depending on the type of diabetes, it can be associated with autoimmune destruction of pancreatic β -cells (type 1 diabetes) or insulin resistance (type 2 diabetes) [1,2]. Pancreatic β -cells are responsible for regulating glucose homeostasis by producing and secreting insulin, however, they become dysfunctional in this pathology [3]. Long non-coding RNAs (lncRNAs) constitute RNA molecules that do not translate functional proteins having regulatory functions. These non-coding RNAs have been explored as potential biomarkers for some diseases [4] and recent studies have identified lncRNAs dysregulated in diabetes suggesting a possible correlation between lncRNAs and β -cell function. This study aims to investigate the lncRNAs as biomarkers of β -cell failure using a bioinformatic approach. A literature search for lncRNAs associated with β -cell function was conducted. Resorting to powerful bioinformatic tools such as LncRRIsearch and GeneTrail, the respective targets were identified, after which an integrative analysis for pathway enrichment was performed to unveil the pathways altered in diabetes. GABA receptor signaling and different metabolism processes emerged as pathways modulated by these lncRNAs. A closer look at the players involved in this analysis can shed light on the lncRNAs as potential biomarkers and provide new directions for novel therapeutic targets and strategies for diabetes management.

Acknowledgments:

FCT-Foundation for Science and Technology, I.P. (Portugal), under the [UIDB/04567/2020] and [UIDP/04567/2020] projects. R.M. and A.G. are funded by FCT Scientific Employment Stimulus contracts [reference numbers CEEC/04567/CBIOS/2020 and CEEC/CBIOS/2-2023, respectively].

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P27 Mediterranean Diet: Relationship between Body Composition and Metabolic Markers in a sample of Portuguese University Students

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Notable changes in environment, emotions, and physiological well-being can be experimented by students transitioning into university [1,2]. These frequently result into lifestyle changes, leading to a decrease in adherence to the Mediterranean Diet (MedDiet) [2]. This study aimed to evaluate the relationship among adherence to the MedDiet, body composition and metabolic markers in a group of Portuguese university students.

A cross-sectional study included 70 participants, of which 74.30% were female, with an average age of 25.03±4.87 years. Body composition was evaluated using the DXA Lunar Prodigy Advance (General Electric Healthcare®), while metabolic markers were assessed by using a Linx Duo (Menarini Diagnostics®). Adherence to the MedDiet was assessed using a 14-point validated questionnaire [3] and categorized into two groups: low (<9 points) and high (≥9 points).

The average adherence score for the MedDiet was notably high (9.23±1.80 points). The group with higher adherence has shown statistically significant differences in High-Density Lipoprotein (HDL) levels and the total cholesterol/HDL ratio, showing healthier values. Similar trends were found regarding body composition, with participants with a greater adherence showing also lower levels of visceral (p=0.005) and subcutaneous (p=0.008) adipose tissue. Likewise, Body Mass Index (p=0.018) and waist circumference (p=0.004) were lower in high adherence score group. There was a negative correlation (p<0.05) between MedDiet adherence and all the aforementioned measurements. Females, health-programs students, and individuals with higher monthly income (€1,000 to €3,000) tended to comply with a higher number of items on the MedDiet adherence questionnaire.

In conclusion, higher adherence to the MedDiet appeared to yield a beneficial and significant effect on lipid profiles, especially on HDL-c levels. Furthermore, a positive association was observed between MedDiet adherence and the distribution of body composition, primarily with lower levels of visceral and subcutaneous adipose tissue.

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P28 Mediterranean food pattern and nutritional status of children / adolescents who practice sports

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According to current trends, a significant increase in the number of obese children is expected between 2020 and 2035 [1]. As a chronic disease, obesity brings with it several long-term consequences that can arise from excess body mass, including, for example, type II diabetes, metabolic syndrome, and atherosclerosis [2]. It is known that a lifestyle in which physical exercise and a balanced diet are key to disease prevention and consequently to a healthy life. The World Health Organization has therefore considered the Mediterranean diet to be a reference dietary pattern for healthy eating [3].

The objective of this study was to evaluate adherence to the Mediterranean food pattern (MFP) in children/ adolescents who practice sports, as well as relating it to their nutritional status. This is a cross-sectional pilot study in which a directly applied questionnaire was applied for sociodemographic characterization and assessment of adherence to the MFP (KIDMED index). An anthropometric assessment was also carried out to characterize nutritional status. 33 male children/ adolescents aged between 5 and 16 years participated in this study, 63.6% attended the 2nd cycle of basic education, 75.8% were normal weight, and 15.2% had an increased cardiovascular risk/ greatly increased. Around 18% had good adherence to the MFP (score ≥ 10 points). No significant differences were found between adherence to the MFP and nutritional status. It is recommended that a larger study be carried out to allow for more solid conclusions about this relationship. However, this study points to a low prevalence of good adherence to the MFP, and it is therefore necessary to consider the possibility of the need to carry out nutritional education sessions with a view to increasing adherence to the MFP by these children/adolescents who practice sports.

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P29 Muscle-Strengthening Exercise Habits in Vegetarians and Omnivorous

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Both muscle-strengthening exercise [1] and plant-based diets [2] are useful in preventing disease, and various studies indicate that there is no inferior athletic capacity associated with plant-based diets [3-7]. Therefore, we sought to examine the prevalence of muscle-strengthening exercise in omnivorous and vegetarians, and what were the main barriers to exercise.

We conducted an online questionnaire on 235 people, of which 58.3% were omnivorous, and 41.7% were vegetarians. The questionnaire included the Muscle-Strengthening Exercise Questionnaire (MSEQ) [8], and sociodemographic questions.

Our results show that vegetarians were more engaged in physical activity (66,3% vs. 49,6%, p-value: 0.011), but usually were more engaged in holistic exercises such as Yoga, Pilates, and Tai-chi (p-value 0.002), while omnivorous were more engaged in weight machines (p-value: 0.004) as well as dumbbells and resistance bands (p-value: 0,020). Lack of time was the main barrier to exercise (58.9% of respondents), followed by lack of training partners (27.2%) and lack of money (24.7%).

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P30 Navigating the Hazards: Understanding Recreational Athletes' Perceptions on Food Supplement Contamination and Adulteration

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P31 New bioactive extracts with potential skin application from marine waste

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In recent years, the consumption of fish products has increased considerably. It is estimated that approximately 2/3 of the total fish quantity is discarded as waste [1]. 60% of sardine biomass is discarded as waste, according to a Portuguese canning company that use sardine as their main product.

This emerging trend aligns with the growing enthusiasm within the scientific community to explore natural products as potent ingredients in cosmetics. This work is part of the Blue4Skin Project, whose main objective is to obtain the major benefits from the fish sub products for the development of new skincare products. Blue4skin project can lead to a more sustainable use of marine resources and contributes to the circular blue bioeconomy.

A preliminary study has already been conducted to extract bioactive compounds, such as collagen and chitosan, from a small amount of sardine scales. The objective of the present work is to optimize the extraction process for these compounds from a larger quantity of scales, along with their chemical characterization.

The sardine scale collagen was extracted in two different methods: acid (acetic acid) and enzymatic (pepsin) technique. Chitosan was isolated by a chemical process involving demineralization, deproteinization, and deacetylation of scales. Additionally, three different ionic liquids were used for collagen and chitosan extraction.

The extraction yields were calculated, and a comparative analysis was conducted. The UV-vis spectrum of the extracted collagen was analysed to estimate its amino acid content. The results showed a peak between 220 and 230 nm, that is in conformity with the typical absorption peak of collagen [2]. The functional groups of isolated collagens and chitosan were identified using Fourier transform infrared (FTIR) analysis.

In conclusion, ongoing research continues to enhance our understanding and utilization of Portuguese marine waste resources as part of the valorisation of co-products of sardine to obtain new Blue4skin products.

Acknowledgements:

This work was supported by the Foundation for Science and Technology (FCT, Portugal) for financial support through projects UIDP/04567/2020 and UIDB/04567/2020.

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P32 Optimization of DASA Precursors Synthesis for Biological Applications

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DASA (donor-acceptor Stenhouse adducts) are a class of organic compounds that can reversibly change their spectral absorption, volume, and solubility. These versatile DASA have a flexible design that allows their use as photoswitches since their properties can change under visible light.[1] Recently, a significant breakthrough was achieved as a DASA compound demonstrated, for the first time, activity in neuronal GABA_ARs, suggesting exciting potential for biological applications.[2]

Nowadays there is a multitude of DASA derivatives with different donors, acceptors and triene backbone configurations, allowing a customization of their physicochemical and photochromic properties.[2] The synthetic routes are well established and, with the aim to improve the yield and decrease the impurities presence in the final products, we focused not only the synthesis of the Meldrum and barbituric precursors but also of the corresponding DASA. This work envisioned the synthesis of new molecules with biological activity and was carried out within the scope of the Erasmus program between Turkey and Portugal. We studied the synthesis of the DASA precursors by using different condition of the starting material, furfural. We tested either direct use of the commercially available furfural or first doing a pretreatment, distillation. The products obtained were analyzed by TLC (thin layer chromatography) and ¹H-NMR (proton nuclear magnetic resonance). Our results showed that by using distilled starting material there was an improvement of almost 50% in the yields of the DASA precursors and of 10-30 % in case of DASA.

With this we conclude that the distillation process has a crucial step in the synthesis of DASA precursors. Despite the time-consuming nature of this step, its implementation proves to be essential for achieving superior results in DASA production, making it an indispensable practice for optimizing the synthesis process.

Acknowledgments.

We would like to show appreciation to Lokman Hekim University, Faculty of Pharmacy in Ankara, Turkey, for the scholarship that granted the Erasmus program.

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P33 Paranaphthalene scaffold exhibits agonist modulatory influence on alpha subunit of PGE2-Bound EP2-GS Complex: Unveiling the mechanistic uterotonic property of *Harungana madagascariensis* Lam. (Hypericaceae) stem

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Mother-child mortality is one of the major health challenges in the developing nations of the world. However, unprecedented usages of oxytocics medicinal plants have been recorded among locals in such nations due to high level of illiteracy, poverty and drug unavailability during child labor. Among the plants utilized for this purpose is *Harungana madagascariensis* (HM). The research aimed at experimental justification of usage of HM as uterotonic and optimization of the lead principle(s) in HM using *ex vivo* and *in silico* bioassays models.

The uterine contractile effect of HM was done using *ex vivo* bioassay model (as described by Bafor *et al.*, 2020) and postulation of the mechanism of action was carried out using computer-aided drug design.

HM exhibited a concentration-dependent increase in percentage amplitude and frequency across the concentrations (0.001 – 0.647 mg/mL) examined, with a significant reduction in overall activity relative to oxytocin $p < 0.05$. Moreover, a slight increase in the amplitude of contraction was observed in HM (35 mg/mL), when the uterus was challenged with oxytocin (OT; 0.05 mM). Although the increase observed in amplitude and frequency were not significantly different from that observed with OT (0.05 mM) $p < 0.05$. Contraction of HM (10 mg/mL) in the presence of 80 mM of KCl showed a reduction in uterine amplitude of contraction, which was not significant $p < 0.05$ with that observed with 80 mM of KCl. Paranaphthalene scaffolds from HA such as Feruginin A, Harunganol A, Harunganol D, Harunganol E, Kenganthranol A, Kenganthranol B, and Kenganquinone were suggested to be responsible for the observed oxytocic activity (binding affinity; -11.786, -11.363, 11.038, -11.447, -11.406, -10.077, and -10.597, respectively), via their promising agonistic interaction with PGE2 receptor relative to other receptors. With the exception of Feruginin A and Kenganthranol B with a molar refractivity of 141.18 and 142.68, respectively other compounds with paranaphthalene scaffold are druggable and also exhibit covalent and hydrogen bond interactions with some key amino acids in the binding site of PGE2. Findings from this research confirmed the usage of HM by the traditional birth attendant in the inducing of labor and managing postpartum hemorrhage.

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P34 Perception of Food Supplements safety associated with sports practice in an Azorean population

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P35 Polyphenol metabolites shaping kidney cancer development

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P36 Quantification of Nutrients and Metals in Touriga Nacional and Arinto Grape (*Vitis vinifera* L.) Pomace Varieties from Portugal

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Wine production in Portugal generates an annual waste volume exceeding 195 thousand tonnes, highlighting the pressing need for sustainable solutions to mitigate its environmental impact. This waste primarily comprises skins, seeds, and stalks, rich in fibers, unsaturated fatty acids, proteins, and polyphenols. The composition of this waste varies depending on grape type and winemaking techniques ^[1,2].

This study focuses on *Vitis vinifera* L. grape pomace sourced from the Alentejo region of Portugal, specifically from Touriga Nacional and Arinto grape varieties. The study involves quantifying nutrients and metals within these *Vitis vinifera* L. pomaces. Nutrient levels, including nitrates (ranging from 45 to 58 mg NO₃/kg) and ammonia (ranging from 104 to 166 mg NH₃/kg), were performed by colorimetric spectroscopy methods on a Skalar SANplus Segmented Flow Auto-Analyzer. Additionally, extractable phosphorus content was measured, yielding values of 101 mg P/kg for Touriga Nacional and 830 mg P/kg for Arinto. Metal content was assessed through atomic absorption spectrometry in a Solaar-Thermo elemental Thermo Fisher Scientific, after digestion in a microwave oven ETHOS PLUS Milestone. Among the metals analyzed, aluminum (Al), arsenic (As), chromium (Cr), copper (Cu), iron (Fe), manganese (Mn), and zinc (Zn) exhibited slightly higher concentrations in Touriga Nacional grape pomace, while cadmium (Cd), nickel (Ni), and lead (Pb) were more pronounced in Arinto grape pomace.

In conclusion, the results obtained indicate the nutritional content of the pomace of two grape varieties of the *V. vinifera* species, namely phosphate, nitrogen, nitrates and metals, parameters of crucial importance and with different roles for the organism.

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P37 Relationship between demand for comfort-food and academic variables in Portuguese university students

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Higher Education is characterized by a period where university students are the target of major psychological changes that directly contribute to compromising their quality of life [1]. Because of their daily exposure to stressful situations, students are the most susceptible target to lifestyle changes with the adoption of a more intuitive diet, since eating habits are mainly influenced by environmental factors [2]. In fact, in situations of changes in the mental state, food can become a compensatory and intuitive strategy in response to this emotional state [3]. For all these reasons, the main objective of the study was to understand the relationship between comfort-food choices and academic variables in Portuguese University Students. This study had the participation of 195 students, aged 18 to 43 years, most of whom attended health sciences related courses. To assess the psychological factors that may influence the demand for comfort-food, we investigated how often the students felt anxious, stressed, dissatisfied, and/or unmotivated in the last 30 days. All stages of the academic path were considered, especially in periods of major assessments and the recognition of their grades. All the psychological factors inherent to the academic performance were directly related to more intuitive eating behaviors, especially when associated with stressful situations and negative emotions, such as stress, anxiety, frustration, and demotivation. According to the results obtained, more than 60.00% of students answered that when they feel more anxious, stressed, unmotivated, and/or unhappy, and consequently their desire to eat increases. These results are aligned with the literature where the students stated that they ate more than usual when subjected to stressful situations, and they prefer foods with lower nutritional value, such as comfort-food than usual. In conclusion, students have high rates of emotional eating, mainly associated with situations of emotional changes due to their academic performance.

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P38 Relationship Between Healthy and Balanced Eating Knowledge and Adherence to the Mediterranean Diet in Primary School Children: An Exploratory Study

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Eating habits in children can influence the probability of developing nutrition-related diseases throughout their lives, making it essential to promote a healthy diet that supports proper growth. This study examined the association between healthy and balanced eating knowledge and adherence to the Mediterranean Diet (MD) among Portuguese primary school children. This exploratory cross-sectional study was conducted between March and May 2023. Data were collected through a face-to-face questionnaire administered at the *Externato Florinda Leal* school. Healthy and balanced eating knowledge was assessed using an instrument adapted from the VERECKEN proposal. Adherence to the MD was evaluated using the KIDMED tool. A total of 29 children participated in this study, predominantly males. Approximately 55.17% of the participants demonstrated good nutritional knowledge, while 62.07% exhibited high adherence to the MD. There were no significant gender differences in nutritional knowledge, but disparities were observed among grade levels. Adherence to the MD varied between genders and grade levels. The degree of adherence to the MD was positively correlated with grade level and gender, while knowledge level was only correlated with grade levels. There was no significant relationship between different levels of MD adherence and healthy and balanced eating knowledge.

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P39 Somaí Paradigm: Establishing Innovative Benchmarks in Medical Cannabis

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Cannabis, a plant with a rich historical background, has served various purposes throughout ancient times, providing materials for clothing, food, and medicine [1]. Its extensive array of over 100 cannabinoids has revealed numerous therapeutic benefits [2]. Cannabinoids have shown promise in alleviating symptoms associated with various illnesses, particularly neurological conditions that currently lack effective treatments, offering an improved quality of life for patients.

Recognizing the potential of cannabis as a valuable source of novel compounds, Somaí Pharmaceuticals is at the forefront of research, establishing new standards for therapeutic innovation. The company is dedicated to developing medical cannabis products to provide relief for debilitating chronic conditions. Somaí Pharmaceuticals takes pride in utilizing the highest quality raw materials to formulate innovative medications with optimal bioavailability, targeting the endocannabinoid system to address specific conditions.

For comprehensively understanding cannabis capabilities and the composition of its biomass, the current study aims to characterize the raw extract, the purified extract and the residues obtained from the production process. The goal is to quantify other compounds outside the cannabinoids, these non-cannabinoids such as phenolic compounds, fatty acids, and chlorophylls, present in the samples. Identification and quantification of cannabinoids and by-products are underway using advanced techniques like HPLC and GC.

The quest of transforming the purified extracts into new therapeutic products has recently begun with the development of nanotechnology-based formulations for oral delivery. The initial screening of the nanosystems composition allowed the selection of the best formulations to proceed for a refined development by quality-by-design strategies.

Acknowledgments.

The authors thank Gatefossé company for kindly providing the lipids used to produce the nanosystems.

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P40 Synthesis and biological activity of halimane amide derivatives from *Plectranthus ornatus* Codd.

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The *Plectranthus* genus (Lamiaceae) is known for its medicinal species, representing a rich source of lead natural compounds with diverse biological activities [1]. Across Africa, Asia, and Brazil, *P. ornatus* Codd. has been used in folk medicine as a replacement for *P. barbatus* to treat a plethora of ailments, including digestive issues, liver failure, infections, and pain [2]. *P. ornatus*' main phytochemical constituents are diterpenes and phenolic compounds, both classes of compounds that are well known for presenting several interesting biological activities. Given this, it is of relevance to study the phytochemical contents of *P. ornatus* in the context of drug discovery and development. The main constituent of *P. ornatus*' acetonetic ultrasound-assisted extract is the halimane compound 11*R**-acetoxylalima-5,13*E*-dien-15-oic acid (**HAL**) [2]. **HAL** was found to have interesting biological activities, such as moderate anti-inflammatory effects, antimycobacterial activity and cytotoxicity. Previous studies by our group, demonstrated that **HAL** has moderate anti-inflammatory and cytotoxic activity against four cancer cell lines (lung A549, leukaemia CCRF-CEM, FaDu and MCF7 with IC₅₀ = 19.38, 16.52, 15.12 and 13.61 µg/mL, respectively) [3,4]. Based on this, the present work aimed for the full physicochemical characterization of the starting material **HAL**, for potential pharmaceutical use, through SCXRD, FT-IR, and thermal analysis, including HSM (165.7°C), DSC and TG. The results of the crystallographic studies indicate that **HAL** crystallizes in the *P*₂₁₂₁ orthorhombic space group, and that R22(8) homosynthons originate pairs of **HAL** molecules as their carboxylic acid moieties form hydrogen bonds. Furthermore, this work aimed to improve the bioactivity of **HAL** through the preparation of new derivatives functionalized using amines. **HAL** derivatives **1**, **2**, **3** and **4** were successfully synthesized and their structural characterization confirmed by ¹H-, ¹³C-NMR, MS and FT-IR. The biological activity characterization of the analogues, namely cytotoxicity against several leukaemia cancer cell lines, is currently on-going.

Acknowledgments:

This work was financially supported by Fundação para a Ciência e a Tecnologia (FCT, Portugal) under projects UIDB/04567/2020 and UIDP/04567/2020 attributed to CBIOS and PhD grant UI/BD/151422/2021. Also to Fundação Calouste Gulbenkian support for this work N°. 275123

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P41 The change in eating habits and the adherence to the Mediterranean diet in the Brazilian population living in Portugal

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Changes in eating habits in immigrant populations are defined as dietary acculturation, a term that characterizes the process of adopting the eating pattern of a different population [1]. It is a complex process that involves several factors and can also be decisive for health when associated with inadequate dietary changes [2]. The Mediterranean diet (MD) is a legacy of the Mediterranean countries but it's also very present in Portuguese gastronomy [3]. In Brazil, although plant-based foods are predominant in the traditional Brazilian diet (TBD), the differences with the MD are significant, mainly in the consumption of red meat and olive oil [4]. Therefore, the present study consisted in a cross-sectional observational analysis and aimed to evaluate changes in eating habits and adherence to the MD in the Brazilian population residing in Portugal. An online questionnaire divided into two parts was carried out, with the participation of 25 Brazilians. The first part addressed questions about characterization and eating habits, whereas the second part of the questionnaire included the PREDIMED test to assess adherence to the Mediterranean diet [5]. The adherence to DM increased in the Brazilian immigrants evaluated, however, the results obtained were not statistically significant. The tendency of immigrants to socialize with groups of the same ethnicity, and the habit of consuming typical foods from their own countries as a way of expressing their identity [6], may explain why Brazilians have not adhered more to the MD.

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P42 The Influence of Ionic Liquids and Deep Eutectic Solvents on DASA isomerization

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Ionic Liquids (ILs) are a distinct class of sustainable solvents, compared to classic organic solvents. They can be modified for various purposes and can dissolve both polar and non-polar compounds due to the combination of different ions [1,2]. Deep Eutectic Solvents (DES), that share similarities with ILs as being considered green solvents, are created by mixing compounds to lower their melting points through strong hydrogen bonds. DES are less expensive and easily obtained from natural sources, providing an advantage over ILs [3]. Molecular photoswitches are small molecules integrating a chromophore. When exposed to light, they possess the ability to undergo a reversible transformation between two isomers, each exhibiting distinct physicochemical properties [4]. Recent studies indicate a growing interest in photoswitchable compounds. These small molecules can change their structure when exposed to light, a property that has a range of applications from catalysis to drug delivery [5]. Common photoswitches include azobenzenes, stilbenes, spiropyrans, and diarylethenes [4,6]. However, traditional photoswitches like azobenzenes, used as dyes due to their strong colour, have some limitations. Their reversible isomerization depends on the solvent used and requires high-energy UV light, what may have harmful effects in biological contexts [7]. To address this limitation, Donor-Acceptor Stenhouse Adducts (DASA) emerged as promising alternatives. They can display photochromism under visible light, making them more versatile. DASA are also synthesized from furfural, a compound easily obtained from plant products [8]. Recognizing the potential of photoswitches in several applications, a study was conducted to understand how these molecules behave in different ILs and DES. The aim was to explore how these solvents influence the equilibrium between the two forms of DASA compounds, through UV-Vis absorbance of each isomer. The study revealed that the stability of one of the isomers is dependent of the solvent chosen, which provides valuable insights into their practical use.

Acknowledgements

The authors show appreciation to Fundação para a Ciência e Tecnologia (FCT) (Ref.UIDB/04138/2020, UIDP/04138/2020, UIDB/04567/2020 and UIDP/04567/2020, and EXPL/OCE-ETA/1109/2021) for financial support.

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P43 The relationship between Nutrition Science Students and the self-perception of body image

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Nowadays, the dissatisfaction of teenagers with relation to their body image has been becoming a problem more and more frequent¹, mainly due to an excessive preoccupation with their physical appearance and with an infinite search for the “ideal body”^{2,3}. This situation can lead to not only weight changes but also to the development of eating disorders since physical dissatisfaction is a risk factor⁴. This current study aimed to evaluate the self-perception of body image, taking into consideration university students who have a Degree in Nutrition Science or Dietetics and Nutrition's. This quantitative observational descriptive study took place in May 2023. For the gathering of data, it was developed an online questionnaire based on the “Body Shape Questionnaire”(BSQ)⁵. There were 137 participants in this study, being the majority female. Having considered all the collected data, the male students present a higher adulteration of their body image compared to the females. Furthermore, according to the results that were collected, the male students present a higher adulteration of the body image in comparison to women. Moreover, the students with an obesity degree demonstrate a more realistic self-perception of their body image. It was also verified that the self-perception of the body image doesn't change throughout the years passed in the course. In addition, the students who practice physical work demonstrate a higher distortion of their body image, compared to the ones that don't. In a nutshell, through the process of this study, it was possible to reach a conclusion stating that most of the students in both courses have an unreal self-perception of their body image.

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P44 The TMBIM4 Golgi ion channel shapes cancer cell survival by modulating metabolic pathways

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P45 TransfersomLLs for the skin delivery of ferulic acid: impact on permeation assays?

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P46 TransfersomILs loading caffeic or *p*-coumaric acids: an innovative approach for cutaneous delivery

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P47 Food Patterns and Mindful Eating: The Correlation Between Food Choices and Awareness of Eating

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Mindful Eating is the application of full attention to eating, encompassing emotions, thoughts, intentions, behaviors, and bodily sensations, considering all the actions and processes necessary to make the moment of eating possible [1,2]. A recent report showed that 70% of the world’s population is reducing their meat consumption, or even excluding it from their diet [3]. A study assessed the animal-restricted eating patterns adopted by the Portuguese population showed that more than 1 million people opt for a vegetarian diet or tend to be vegetarian [4]. The purpose of this study was to evaluate the relationship between eating patterns and the practice of Mindful Eating. It sought to understand whether a dietary pattern is related to greater food consciousness and mindfulness.

A cross-sectional descriptive observational study was carried out with a final sample of 118 individuals aged between 18 and 60 years of both sexes (83.1% women) and 87.2% had a Bachelor’s degree or higher. An online questionnaire was applied consisting of sociodemographic characterization, education, eating patterns (omnivore, flexitarian, vegetarian, or vegan) and the “Mindful Eating Questionnaire” (MEQ) [5].

As for dietary patterns, 71.2% (n=84) were omnivores and 28.8% (n=34) non-omnivores. A comparison of the MEQ results between the groups showed a higher score for the non-omnivore group in almost all the subscales. There was a significant difference between the two groups in the subscale’s consciousness (p-value=0.008) and external stimuli (p-value=0.014), as well as in the overall score (p-value=0.025). Mindless eating is at the heart of many ecological and social problems associated with modern nutritional behavior. In contrast, increased food awareness tends to relate to changing habitual patterns of how to eat and what to eat. It is understood that these results may stem from purpose-integrated dietary control, increased awareness of food production and origin, as well as dissociation from ‘automatic’ behaviors and patterns related to eating [6]. It was found that an adherence to typically non-traditional eating patterns, with restriction of animal food sources, seems to be related to a greater consciousness of food choices. This study contributed to highlight the influence of the type of food pattern as a determinant of individuals’ food choices, presenting an innovative and inspiring insight for the field of behavioral nutrition.

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