Enti finanziatori	Bando	Bando - Nome	Titolo Progetto	Acronimo Progetto	Numero contratto	CUP	Abstract	Coordinatori e Partner	Responsabili Scientifici	Costo globale del Progetto per tutto il partenariato	Costo Totale del Progetto per l'Ateneo - Assegnato (EURO)	Contributo globale del Progetto per tutto il partenariat	Contributo Totale Ateneo - Assegnato (EURO)	Settori ERC	Dipartimenti con ruolo - Soggetti interni	Anno Presentazione	Anno finanziamento/Approvazione	Referente amministrativo	Data di inizio attività	Data di fine attività	Approvazione Ente Finanziatore
M.U.R. - Ministero dell'Università e della Ricerca	D.D. n. 1409 del 14-9-2022	Bando Prin 2022 PNRR	Low-cost, high-safety hydrogen storage into chemically-enhanced clathrate hydrates for energy storage in planetary infrastructures	BRAVE NEW WORLDS	P20224C3NJ	D53D23016930001	The aim of this project is to develop low-cost, high-safety media for the storage of hydrogen, which also have minimal technologic and maintenance requirements. Target storage media will be ideally suitable for space-based infrastructures on near planets (e.g., Mars) or satellites (e.g.. Moon), where hydrogen will be produced from planetary water bodies by solar cell-powered electrolysis. Currently, hydrogen is stored in pressurized cylinders, or in metal hydrides and similar compounds that require high energy consumption to store and recover Hz. None of those storage technologies are suitable for planetary infrastructures, because of the high spacecraft payloads needed to carry cylinders, compressors, metallic media and other highly technological devices to be deployed and assembled in situ. Furthermore, the control of the compression of hydrogen into cylinders, or the temperature cycles for the sorption onto metal hydrides, require sophisticated, failure-prone control appliances. The storage media that the present project will develop are clathrate hydrates of hydrogen, a class of supramolecular solids consisting of water molecules organized in cage structures that can host one or more gas molecules. These systems represent a safer, technologically simpler, and cheaper alternative for large-scale hydrogen storage than traditional storage methods. Clathrate hydrates are formed under conditions of pressures around 5-10 MPa and temperatures of around 250-280 K, or, importantly, under lower pressures and very low temperatures. Thus, Important features that we want to exploit in this research project are the following: • clathrate hydrates are essentially made up of water, an economical, ecological and safe compound par excellence. Having a potentially infinite life cycle, water is an ideal material for this purpose. • Water is found on (or just below) planet and satellite surfaces. • Sun-shaded or deep crater areas of planets and satellites reach temperatures as low as 30 K • Hydrogen hydrates can form at very low temperatures under mild gas pressures This project aims to overcome some critical points of hydrogen storage in clathrates, namely (i) slow capture kinetics, and (ii) low gravimetric content. As for point (i), the PI has already developed and patented processes and molecules for improving the kinetics of the process of 1- 2 orders of magnitude. The increase of the gravimetric content (point (ii)) will instead be addressed with the design and test of stabilizers (co-formers) of the hydrate cages, through a combination of rational design, quantum mechanical and molecular dynamics approaches, stochastic methods, and chemical synthesis. The goal will be to develop a hydrogen storage medium with a gravimetric H2 content around 4 wt%, which is demonstrably competitive with current top technologies at a fraction of the technological level and economic cost.	Università degli Studi G.D'Annunzio di CHIETI; Università degli Studi di BARI "Aldo Moro"; Istituto Nazionale di Astrofisica	DI PROFIO, PIETRO	238637	118625	238637	118625	PE5_16 - Supramolecular chemistry; PE11_8 - Engineering of alternative established or emergent materials; PE4_4 - Surface science and nanostructures	DIPARTIMENTO DI FARMACIA (Principale)	2022	2023	SCIMONE, Anna	30/11/2023	29/11/2025	Decreto di ammissione al finanziamento n. 1384 del 01.09.2023
M.U.R. - Ministero dell'Università e della Ricerca	D.D. n. 1409 del 14-9-2022	Bando Prin 2022 PNRR	Carbon-High AdsoRption bY Bi-functionalizeD solId Sorbents	CHARYBDIS	P20227NJBK	D53D23016970001	The goal of the CHARYBDIS project will be the development of functionalized solid sorbent, highly selective and efficient towards CO2 capture in gas mixtures like syngas, flue gas and biogas. The main innovation will be the production of promising materials that intrinsically have lower- risk components and are sustainable from an environmental and economical point of view, creating an interesting, safe and green alternative to the actual separation techniques. Hybrid systems based on the combination of polymers and graphene nanomaterials bearing specific nitrogen functional groups, which are able to behave like specific interactions sites with CO2, will be prepared. To increase their contact surface with gases and their adsorbent capacity, fibers based on these nanohybrid systems will be prepared by electrospinning technique. Not only their ability like absorbent materials but also their eco- compatibility and their impact on ecosystem will be investigated. The synthetized materials will be further tested in patented reactors to evaluate their capability in CO2 capture. Different parameters such as pressure, temperature and time of adsorption/desorption will be tested, as well as several consecutive cycles to assess the durability of the new materials. Moreover, physico-chemical characterization of the adsorbents before and after CO2 adsorption will be achieved by the use of different techniques (Raman Spectroscopy, FT-IR, NMR, XRD, DSC, Electron Microscope, and Atomic Force Microscope), as well as theoretical modeling to assess the exact interaction mechanism and energetic features. The project would be carried out by two research groups with complementary skills. The Gas Hydrate Facility (GHF) of the University of Chieti, specialized in the study of CCS technologies and other high-pressure processes, involved for many years in several interdisciplinary activities with academic and industrial partners. The GHF (gashydrate.weebly.com) is equipped with patented reactors (EP 20240778 1) to study the aspects of interest of processes under specific temperatures and pressures. The Laboratory of Organic Synthesis and Biomaterials (SYMAT) of the University of Messina will be the second research unit in the project. The SYMAT research activity concerns the development of suitable derivatized nanomaterials, their characterization by several physical-chemical techniques and the investigation of their biocompatibility and their impact on eco-system.	Università degli Studi G.D'Annunzio di CHIETI; Università degli Studi di MESSINA	CIULLA, MICHELE	239974	140258	239974	140258	PE5_15 - Polymer chemistry; PE5_16 - Supramolecular chemistry; PE5_17 - Organic chemistry	DIPARTIMENTO DI FARMACIA (Principale)	2022	2023	SCIMONE, Anna	30/11/2023	29/11/2025	Decreto di ammissione al finanziamento n. 1384 del 01.09.2023
M.U.R. - Ministero dell'Università e della Ricerca	D.D. n. 1409 del 14-9-2022	Bando Prin 2022 PNRR	Drug repositioning as a safer and sustainable way to fight hard-to-treat cancers	DEFT	P2022T7FXB	D53D23022690001	Hard-to-treat tumors represent a major challenge in cancer patient management due to the limited response to current available anticancer therapies, including radio-, chemo- and immune-therapy. In these tumors, such therapies still face several drawbacks, including the development of drug resistance, the presence of severe side effects, especially by using combined treatments, and the activation of immune escape mechanisms, which severely hamper their effectiveness. Thus, novel, more effective and safer agents are urgently needed to improve outcome of patients with highly challenging tumors. In such a scenario, repurposing of approved non-oncology drugs in cancer therapy is an effective option that has been already successful in the treatment of several malignancies to date. This attractive strategy may overcome several issues associated with de novo drug discovery process, including the high rate of failure of novel molecules during clinical trials, the expensive developing tasks and the slowness of drug approval procedures. Indeed, candidate agents to be repurposed have well recognized pharmacokinetic/pharmacodynamic properties and good safety profiles, which may facilitate a rapid translation of preclinical results in human therapy. Based on these considerations, development of inexpensive, low toxic, already approved non-anticancer drugs to be exploited alone, or in combination in cancer treatment represents a valuable opportunity, especially in cases of highly challenging, poorly responsive malignancies, including advanced melanoma, pancreatic and triple negative breast cancers, which are the focus of this collaborative proposal.	Università degli Studi G.D'Annunzio di CHIETI; UNIVERSITA' DEGLI STUDI DELLA CAMPANIA "LUIGI VANVITELLI"; Università degli Studi della CALABRIA	CAMA, ALESSANDRO	209361	83361	209361	83361	LS1_13 - Early translational research and drug design; LS7_8 - Effectiveness of interventions, including resistance to therapies	DIPARTIMENTO DI FARMACIA (Principale)	2022	2023	SCIMONE, Anna	30/11/2023	29/11/2025	Decreto di ammissione al finanziamento n. 1363 del 01.09.2023
M.U.R. - Ministero dell'Università e della Ricerca	D.D. n. 1409 del 14-9-2022	Bando Prin 2022 PNRR	A heparan sulfate proteoglycan binding protein and Light-Emitting Diodes-LEDs/Complex Electromagnetic Fields-CMFs technologies as innovative eco-sustainable strategies to counteract chronic wound infections associated to Staphylococcus pseudintermedius resistant strains: an interdisciplinary approach to animal-human health	P20224AEAC	P20224AEAC	D53D23016330001	The antimicrobial resistance-(AMR) phenomenon is a worldwide challenge involving human, animal and environmental health that strongly requires new sustainable intervention strategies. The focus of this project is twofold: 1) to address the knowledge of the physiopathology of S. pseudintermedius- (Sp) responsible of dynamic animal-human transmission and chronic wound-(CW) infections; 2) to study the antimicrobial/anti-virulence effects of sustainable combination consisting of recombinant protein-NK1 and novel technologies (Light-Emitting-Diodes-LEDs/Complex Electromagnetic Fields-CMFs) at low environmental impact. The project is in line with the "UN Agenda 2030" for Sustainable Development suggesting treatments to counteract the AMR based on natural compounds and novel technologies. Sp, an emerging zoonotic agent of canine origin, is an opportunistic pathogen causing diseases in dogs such as otitis externa, pyoderma, and wound infections. The worldwide spread of multidrug- resistant methicillin-resistant-Sp-(MRSP) and methicillin-susceptible- (MSSP) strains represents a health problem for both pets and humans. Biofilm formation is one of the most important virulence factors of Staphylococci, facilitating the bacterial colonization and hindering the treatments. Thus, the discovery of novel agents for treatment of Sp- associated and biofilm-related infections is highly warranted. The main objectives include: the elucidation of the molecular mechanisms involved in the Sp virulence; the identification of sustainable approaches to fight Sp infections in dog and human CWs. To address these objectives, MRSP and MSSP strains will be isolated from dog CWs and characterized for their virulence profiles. The selected strains, combined with the main microorganisms isolated in dog and human CWs, will be studied for their interactions in 3D gradient that mimics the CW spatial microbial distribution and environment, the Lubbock Chronic Wound Biofilm-(LCWB) model. The bacteria of Staphylococcus genus bind to the host cell surface or the extracellular matrix components, in which heparan sulfate proteoglycans- (HSPGs) play key roles. The recombinant synthesis of a natural splice variant of hepatocyte growth factor-(HGF), NK1, which is able to bind HSPGs and interfere with microbial adhesion and internalization into target cells, will be carried out. The role of novel technologies, LEDs and CMFs, as additional instruments to affect the antibiotic resistance/tolerance has emerged. Thus, NK1 alone or combined with novel technologies will be investigate against MRSP and MSSP in the LCWBs. To explore the molecular mechanism of NK1 action, and its capability to inhibit Sp infection in cellular tools and to modulate the cellular signaling pathways involved in the pathogenesis of Sp, will be also evaluated. The results will identify sustainable strategy to counteract CW infections associated to Sp strains both in dog and human populations.	Università degli Studi G.D'Annunzio di CHIETI; UNIVERSITA' DI NAPOLI FEDERICO II	DI LODOVICO, SILVIA	242363	113363	242363	113363	LS6_8 - Biological basis of prevention and treatment of infection; LS6_5 - Biology of pathogens (e.g. bacteria, viruses, parasites, fungi); LS1_9 - Molecular mechanisms of signalling processes	DIPARTIMENTO DI FARMACIA (Principale) ; DIPARTIMENTO DI SCIENZE MEDICHE, ORALI E BIOTECNOLOGICHE (Aggregata)	2022	2023	SCIMONE, Anna	30/11/2023	29/11/2025	Decreto di ammissione al finanziamento n. 1368 del 01.09.2023
M.U.R. - Ministero dell'Università e della Ricerca	D.D. n. 1409 del 14-9-2022	Bando Prin 2022 PNRR	Activation of Carbonic Anhydrases encoded by the human probiotics to enhance gut microbiota performance against dysbiosis and microbial infections	P2022LX2RM	P2022LX2RM	D53D23017140001	The human host is colonized by at least 100 trillion microbial cells, and high- throughput sequencing has expanded our knowledge of resident microorganisms such as bacteria, archaea, eukaryotes, and viruses. The human microbiota produces many chemicals communicating with the host, which are essential for body physiology, as well as for other host functions such as protection, metabolism, and immunity. Probiotics have been defined by the World Health Organization as "live microorganisms which, when administered in adequate amounts, confer a health benefit on the host". They are effective in alleviating diarrhea and other gut-related side effects associated with antibiotic therapy, restoring a healthy gut microbiota composition. Bifidobacterium spp.. Lactobacillus spp. and Saccharomyces boulardii are the most routinely employed probiotics alone or in association with prebiotics. The pharmacological modulation of a protein target to achieve agonism (activation) or antagonism (inhibition) in different contexts has led to many successes in disease control. Here, we focused on a superfamily of enzymes, carbonic anhydrases (CAs), also encoded by the genome of pathogenic and non-pathogenic bacteria, which with their activity, provide the indispensable CO2 and HCO3-/protons to microbial biosynthetic pathways, catalyzing the reversible reaction of CO2 hydration to HCO3- and H+. Among the eight classes described in all kingdoms of living organisms, only four CA classes (a, P, γ and i) have been identified in bacteria. Due to the reaction catalyzed by CAs, it is assumed that the gut microbiota responsible for human well–being might be reinforced and improved by activation of their CAs. The CA activity is intensified explicitly with molecules acting as CA activators (CAAs), which are usually biogenic amines or their derivatives, amino acids and oligopeptides that can bind to the middle-exit part of the CA active site. Therefore, in this curiosity-driven project, the activity of the CAs, encoded by the most important human probiotics, such as Bifidobacterium longum. Lactobacillus rhamnosus and Limosilactobacillus reuteri will be modulated to enhance metabolism and performance of probiotics, prevent/treat dysbiosis and microbial infections and finally improve the host-probiotic interaction. This project fits with the goal "Citizens stay healthy in a rapidly changing society thanks to healthier lifestyles and behaviours, improved evidence–based health policies, and more effective solutions for health promotion and disease prevention".	Università degli Studi G.D'Annunzio di CHIETI; Università degli Studi di CAGLIARI; CONSIGLIO NAZIONALE DELLE RICERCHE	CARRADORI, SIMONE	238995	91806	238995	91806	PE5_18 - Medicinal chemistry; LS6_5 - Biology of pathogens (e.g. bacteria, viruses, parasites, fungi); LS7_12 - Health care, including care for the ageing population	DIPARTIMENTO DI FARMACIA (Principale)	2022	2023	SCIMONE, Anna	30/11/2023	29/11/2025	Decreto di ammissione al finanziamento n. 1384 del 01.09.2023
M.U.R. - Ministero dell'Università e della Ricerca	D.D. n. 1409 del 14-9-2022	Bando Prin 2022 PNRR	Health promotion and neuropathic pain prevention through glymphatic system modulation: a sex/gender perspective	P2022Y9W3R	P2022Y9W3R	D53D23021800001	The glymphatic system allows the correct balance between the influx of the cerebrospinal fluid in the brain parenchima and waste clearance. Mainly active during sleep, its impairment was related to several neurological diseases. Circadian dysregulation, neurotransmitter level alteration and a broad maladaptive plasticity of the central nervous system are key findings also of neuropathic pain, a chronic, debilitating pathology currently unresponsive to treatments. The present project aims to investigate the connection between chronic neuropathic pain and glymphatic system dysfunction with the final objective to individuate a natural product-based approach to improve quality of life reducing pain sensitivity. Neuropathy will be modelized in male and female mice by the administration of the neurotoxic, anticancer drug paclitaxel. The pain threshold and the related behavioral alterations will be studied alongside with sleep disturbance- related molecular characteristics through the evaluation of clock genes expression (CLOCK, BMAL, PER, CRY, REV-ERBalpha) in selected brain areas (such as hypothalamus, cortex). As a linker between sleep-wakefulness cycle and pain, the somatotropic axis will be investigated (GHRH and GHRH-receptor genes brain expression) since animals with genetic mutations leading to GHRH deficiency showed increased pain sensitivity, a reduction in sleep duration and depth, as well as NREM phase, and a pituitary clock gene expression dysfunction. The glymphatic system activity will be explored in vivo by Nuclear Magnetic Resonance analysis. On this physiopathological base, a therapeutic approach will be reached evaluating the properties of the vegetal blend composed by Moringa oleifera Lam., Withania somnifera and Polygala tenuifolia, all able to favor sleep and regulate the circadian rhythm. In vitro, in astrocyte cell culture and in nerve endings (synaptosomes) and astrocytic (gliosomes) processes, the ability of the extracts to protect against paclitaxel injury will be assessed by biochemical and molecular approaches (as redox unbalance, aquaporin 4 and clock gene levels). Furthermore, the possible pharmacodynamics will be analyzed looking at the modulation of hydrogen sulfide, a gas-transmitter implied in pain regulation. The blend activity against behavioral and molecular paclitaxel-induced alterations will be studied in vivo, thanks to the well established good safety profile of these vegetal products. These results, along with a rational design of therapeutic interventions, would concur to significantly improve the patient's quality of life and might offer more effective solutions for health promotion.	Università degli Studi G.D'Annunzio di CHIETI; Università degli Studi di FOGGIA; Università di PISA	BRUNETTI, LUIGI	275251	79895	275251	79895	LS7_7 - Pharmacology and toxicology	DIPARTIMENTO DI FARMACIA (Principale)	2022	2023	SCIMONE, Anna	30/11/2023	29/11/2025	Decreto di ammissione al finanziamento n. 1369 del 01.09.2023

M.U.R. - Ministero dell'Università e della Ricerca	D.D. n. 1409 del 14-9-2022	Bando Prin 2022 PNRR	Ultrasonic Technology for the Sustainable Chemical Synthesis of Peptide-based Therapeutics	US4PepTher	P2022SZAMB	DS3D23016950001	On the basis of the limited knowledge upon US-assisted chemical synthesis of as a synthetic strategy much more oriented towards a greener scope, this proposal will focus on the pursuit of ultrasound-assisted sustainable procedures for the synthesis of peptide-based therapeutic molecules. The overarching idea behind the US4PeptTlicr project is the development of an innovative green SPPS method that, taking advantage of the energy provided by ultrasounds, could potentially represent a valid alternative to the non-benign and less efficient protocols currently used in peptide chemistry. Making peptide synth4esis greener by US-SPPS strategy is firstly encouraged by the features of the ultrasounds that are in complete agreement with the principles of green chemistry. For instance, there are several green advantages related to the use of ultrasonication, such as i) enhancement of rates, yields and selectivity ("sonochemical switching"); ii) reduction of reaction time; iii) limited energy consumption and waste production; iv) possibility to conduct reactions by non-classical solvents (e.g. PEG and water, instead of volatile organic solvents) or solventless. All these promising aspects can be translated into the preparation of cyclopeptides, which conventional strategy utilizes coupling agents in liquid-phase to cyclize the linear precursors. This method is often accompanied by low efficiency and yield, more by-products, difficult purification, and reuse/degradation of waste resin together with severe environmental pollution. By suppressing solvent-intensive chromatography, it could be possible to improve the greenness of macrocyclic peptides production. Linear peptides obtained by SPPS can be functionalized at the N-terminus with an orthogonal dual-mode linker. This linker allows the capture of the linear peptide on a solid support followed by cyclization reaction at basic pH and concomitant release of desired macrocycle. Free side products such as hydrolysis fragments, truncated sequences or *impurities* from the crude peptide are excluded lacking a suitable nucleophile, leading to a pure peptide. The traditional chloroacetate displacement method provides peptides longer than 10 amino acids with a purity of less than 20%, while this methodology could reach purities of 60-91%, thus limitating or eliminating chromatography application. Joining the "catch-release" application to an optimized US- SPPS protocol could greatly increase the yield of pure peptides with sensible reduction of costs, time and waste.	Università degli Studi G.D'Annunzio di CHIETI; UNIVERSITA' DI NAPOLI FEDERICO II; UNIVERSITA' DEGLI STUDI DELLA CAMPANIA "LUIGI VANVITELLI"	STEFANUCCI, AZZURRA	223465	53825	223465	53825	PE5_18 - Medicinal chemistry; PE5_17 - Organic chemistry	DIPARTIMENTO DI FARMACIA (Principale)	2022	2023	SCIMONE, Anna	30/11/2023	29/11/2025	Decreto di ammissione al finanziamento n. 1384 del 01.09.2023
M.U.R. - Ministero dell'Università e della Ricerca	D.D. n. 1409 del 14-9-2022	Bando Prin 2022 PNRR	Bergamot essential oil in gut-brain disorders	BEO-MGBD	P2022CJNWW	DS3D23021570001	STATE OF ART Inflammatory bowel disease (IBD) is a chronic biopsychosocial disorder that affects 4%-10% of the global population and is associated with markedly reduced quality of life. It is characterized by genetic predisposition, adverse life events, psychosocial factors, stress, and gastrointestinal infections. Because of its heterogeneity and unclear etiology, clear biomarkers, and therapeutic targets lor have been difficult to identify. IBDs represent a set of medically unexplained disorders of the bidirectional communication between the gut and the brain. They are multifactorial and include visceral hypersensitivity, low-grade inflammatory responses, intestinal motility disturbances, alterations of central nervous system processing, and alterations in gut microbiota composition. Interestingly, Bergamot essential oil (BEO) provides extensive preclinical evidence of analgesic properties activity in different pain models, induces anxiolytic-like and antispasmodic effects. The use of a natural product endowed with these properties and devoid of remarkable toxicity would represent an important option for the management of gut inflammation, visceral pain and cognitive symptoms observed in IBD patients. Neurochemical evidences suggest that BEO can produce its neurobiological effects by an interference with fine mechanisms involved in synaptic plasticity however, neuronal pathways underlying its effects have not yet been identified and deserve to be investigated. KEY AIMS This proposal, by applying a multidisciplinary approach, starting from an animal model toward simplified ex vivo and in vitro approaches, aims to investigate therapeutic profile of BEO and its main constituents in a IBD murine model: AIM 1) investigate the efficacy of BEO in gut inflammation and visceral pain AIM 2) investigate the role of neurotransmissions in behavioral effects of phytocomplex; AIM 3) investigate the ability of BEO to interfere with neuroinflammation and neuroplasticity; AIM 4) investigate the modulation of microbiota considering its role in inflammation and immune dysfunction via the gut- brain axis DESCRIPTION OF THE PROJECT Objectives will be pursued with specific work packages (WPs): WP I Biocompatibility and toxicity of BEO: in vitro studies; WP 2 Pharmacological evaluation of BEO in the pathophysiology of IBD in in vivo and ex vivo experiments; WP 3 Pharmacological evaluation of BEO on behavior and neurotransmitters dysfunctions: locus on gut-brain—axis. RELEVANCE OF THE PROJECT Pharmacological characterization of therapeutic profile of BEO and its brain constituents would represent an important option for the management of gut inflammation, visceral pain and cognitive symptoms observed in IBD. This proposal will provide new insights into the relationship between microbiota and neuroinflammation and will help explain the complexity of the microbiota—gut—brain axis and provide a theoretical basis for proposing new therapeutic strategies for IBD.	Università degli Studi G.D'Annunzio di CHIETI; Università degli Studi della CALABRIA; UNIVERSITA' DI NAPOLI FEDERICO II	ORLANDO, GIUSTINO	230745	69276	230745	69276	LS7_7 - Pharmacology and toxicology	DIPARTIMENTO DI FARMACIA (Principale)	2022	2023	SCIMONE, Anna	30/11/2023	29/11/2025	Decreto di ammissione al finanziamento n. 1369 del 01.09.2023