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Ozzano dell'Emilia (BO), Italy, 1-2 December 2016

ABSTRACT BOOK

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GABRIELLI LECTURE (INVITED)

NOTE ANTROPOLOGICHE SUL SENSO DELL'ABITARE

F. Gabrielli*
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L'uomo è un essere profondamente economico, in questo senso abita la terra nel segno dei bisogni, di cui individua la natura, delinea le strategie di soddisfacimento, concretizza l'effettiva messa in scena. Il quotidiano è pervaso di economia, poiché è *nella sincerità della fame e della sete* che si snodano i vissuti biografici e le narrazioni collettive. Una filosofia che intenda davvero essere fedele a se stessa, ovvero al suo germinare dalla vita per tornare ad essa, deve essere all'altezza del quotidiano. Un punto, questo, colto con assoluto nitore da Emmanuel Lévinas, là ove rimarca come lo svuotare il discorso filosofico della sua originaria presa sul quotidiano, significa : *"[..] misconoscere la sincerità della fame e della sete; significa, con il pretesto di salvare la dignità dell'uomo compromesso dalle cose, chiudere gli occhi sulle menzogne di un idealismo capitalista, sulle evasioni nell'eloquenza e nell'oppio che propone"* (*Dall'esistenza all'esistente* , tr. it. Marietti, Genova 1986). L'uomo, tuttavia, per essere soggetto consapevole di soddisfacimento dei bisogni - e non mero *funzionario dell'esistenza*, inconsistente espressione reattiva agli stimoli del mondo – deve radicare i bisogni stessi nelle dinamiche del costruire e dell'abitare. L'abitare costituisce, rispetto al costruire, un'eccedenza di senso: si tratta di dare a ciò che abbiamo calcolato, misurato, perimetrato, un orientamento, un significato che vada oltre i muri eretti, la suddivisione delle stanze, lo spazio riservato alla sala da pranzo. Martin Heidegger ha dedicato a questo tema pagine straordinarie: "*L'essenza del costruire è il «far abitare». Il tratto essenziale del costruire è l'edificare luoghi mediante il disporre i loro spazi. Solo se abbiamo la capacità di abitare, possiamo costruire. Costruire e pensare sono sempre, secondo il loro diverso modo, indispensabili per l'abitare. Entrambi sono però anche insufficienti all'abitare, fino a che attendono separatamente alle proprie attività, senza ascoltarsi l'un l'altro. Questo lo possono fare quando entrambi, costruire e pensare, appartengono all'abitare, rimangono entro i loro limiti e sanno che l'uno e l'altro vengono dall'officina di una lunga esperienza e di un incessante esercizio"* ("Costruire abitare pensare", in *Saggi e discorsi*, tr. it. Mursia, Milano 1976). Insomma, il rapporto tra costruire e abitare è quello tra mezzo e fine, tuttavia senza distinzione ma in un flusso continuo (gli animali, continua Heidegger, hanno rifugi, tane, ma non abitano). L'esistere, in ultima analisi, si identifica con l'abitare, con il significato di "coltivare e custodire il campo": misuro, calcolo, divido, suddivido, prendendomi cura del misurato, cioè della casa, poiché il dividere e suddividere è, in realtà, un condividere con altri (dalla mia famiglia alle altre famiglie). L'economia, con il noto significato di "legge della casa", è esattamente questo, un *misurare e calcolare secondo convenienza* in quel luogo particolare che è la "casa", in cui si sperimenta la relazione con l'altro, con gli altri (su questo tema, rinvio alle incisive pagine di S. Petrosino, *Elogio dell'uomo economico*, Vita e Pensiero, Milano 2013). L'economia è, dunque, scena della relazione, cifra ineludibile dell'abitare, che non dipende dalla semplice metratura, dall'oasi di verde, dallo strutturarsi come campana o città, ma dal lacaniano *nome del padre*, cioè dall'originaria esperienza dell'altro (si legga, in questo senso, lo splendido saggio a quattro mani di un architetto, Roberto Bianchi, e di un filosofo, Enrico Garlaschelli, *Abitare il costruito. Riflessioni di architettura e filosofia sul tempo presente*, Rubbettino, Soveria Mannelli 2015). Abito nel momento in cui l'altro fa la sua apparizione sulla scena umana, nel momento in cui mi interpella con il suo "eccomi!", ed io rispondo con sollecitudine "sono qui!" Abitare l'altro, significa abitare un "trauma", aprirsi ad una "intrusione" da cui germina il *principio di umanità*: divento uomo nella misura in cui faccio della casa il luogo di accoglienza/custodia dell'altro (S. Žižek, *Credere*, tr. it. Meltemi, Roma 2005). L'altro si sottrae sempre ad ogni mia pretesa di potere/sapere, è una voragine senza fondo, mai colma e colmabile, una continua eccedenza, una dismisura assoluta che irrompe nel costruito, misurato, calcolato, con la nettezza e la sacralità del suo volto. Un volto, in campagna o in città, in ufficio o in camera da letto, al ristorante o in metropolitana, non possiamo mai costruirlo, calcolarlo, perimetrarlo, bensì *abitarlo nella distanza*, ovvero coglierlo in un tratto, una parola, un gesto, senza pretesa alcuna. Il volto dell'altro è atopico per eccellenza, senza luogo, senza misura, senza un *qui* inconcusso e indubitabile. Come dice Barthes, che suggella compiutamente queste scarne righe: " *Essendo atopico, l'altro fa tremare il linguaggio: non si può parlare* di *lui*, su *di lui; qualsiasi attributo è falso, doloroso, goffo, imbarazzante*" (*Frammenti di un discorso amoroso*, tr. it. Einaudi, Torino 1979).

SESSION 1: CLIMATE CHANGES AND AQUATIC POPULATIONS

ORAL COMMUNICATIONS

INDIVIDUATION OF BIOMARKERS AND SECONDARY METABOLITES, RELATED TO ENVIRONMENTAL CHANGE, IN MARINE ORGANISMS

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In response to environmental changes, it is increasingly necessary to detect early responses in exposed marine organisms, in order to implement corrective and predictive measures that could prevent or limit the damage to the upper levels of ecological organization (population, community, ecosystem). In this regard, secondary metabolites and molecular markers can reveal, if properly selected and evaluated in a species-specific approach, excellent early warning sensors. In our study we evaluated, in different marine model systems (extremophile bacteria, micro-algae, molluscs, fish and primary cell cultures), the responses of some biochemical nutritional markers and secondary metabolites to different environmental changes (temperature, salinity, UV exposure, nutrients availability). The preliminary results showed that, among the most sensitive indicators, some lipids, polyphenols, carotenoids and molecular markers, reveal a close correlation with the intracellular redox status which, as is well known, is directly affected by chemical-physical variations of cellular environment. This finding therefore suggests that, some of these, could potentially be elected as biomarkers of early warning for environmental change.

THE IMPORTANCE OF RESEARCH IN ECONOMIC AND ENVIRONMENTAL EXPLOITATION OF A FRAGILE TRANSITIONAL ECOSYSTEM: THE GANZIRRI LAGOON (NE SICILY)

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Coastal lagoons support a range of natural services that are highly valued by society, including fisheries productivity, storm protection, tourism, and others. In some cases, those environments suffer urbanization processes. Is the case of Ganzirri lagoon: in fact, a demographic increase in the last 50 years leaded to a worsening of water variables. For this reason, shellfish farming (mussels and clams) has been prohibited from 1981. In 2001 this zone has become Natural Oriented Reserve, and the impact of urbanization on lagoon waters begin to decrease. Our research focused attention on water parameters in order to assess both the good environmental quality and the possibilities to restore clam culture practices. Our studies involved the monitoring of main water variables. All these variables are fundamental to assess many features, such as: aquatic pollution, eutrophication, ecosystem "health" status, production capacity. The results obtained during the years, shows that physic and chemical variables follow seasonal trends, and despite some peaks of temperature (32°C), do not influence the living organisms. pH trend is between 7.98 (winter) and 8.5 (spring). Organic carbon comes mainly from phytoplankton elements (autotrophic), very abundant in the lake of Ganzirri. This result and the amount of TC (28-32 mg/l) suggest the potential of organic carbon reserves for the "sustainability" of this biotope. The microbial indices do not exceed the law limits, and the other variables showed a good production capacity of this environment. Thanks to this and other studies (conducted by ARPA and ASL), in July 2016 the water of Ganzirri lagoon has been characterized as suitable for shellfish culture.

CYTOTOXICITY OF VENOM FROM HETEROTRICHOUS MICROBASIC EURYTELE NEMATOCYSTS OF *PELAGIA NOCTILUCA* (CNIDARIA: SCYPHOZOA) TO L929 MOUSE LUNG FIBROBLASTS. PRELIMINARY RESULTS

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During last decades many studies highlighted cnidarian relevance in worldwide trophic chains, as well as the considerable frequency and size of outbreaks over the years. A high inter-specific variability, survival ability and harsh conditions resistance built a clear path for these animals to the top of trophic chains, with a corresponding raising impact on sea-related anthropogenic activities. Indeed, cnidarians possess efficient stinging characteristics and represent a threat to bathers and fishermen. *Pelagia noctiluca* (Forsskål, 1775), the "Mauve Stinger", is a common Mediterranean scyphozoan jellyfish. It occurs mainly from March to May, but also throughout the year in South Tyrrhenian waters around Northeastern Sicily. The venomousness of this jellyfish is due to three main different kinds of nematocysts, which are known to contain toxins which at present are not exhaustively known. In this study, a first evaluation of the cytotoxic activity of heterotrichous microbasic eurytele nematocysts from *Pelagia noctiluca* is presented and discussed. Nematocysts were isolated from tentacles of *Pelagia noctiluca* and the content was extracted by sonication (aqueous extract). Cytotoxicity assays employing MTT assay and Trypan Blue dye exclusion were carried out on L929 mouse lung fibroblasts. Aqueous extracts induced cytotoxicity to L929 cells with 36.9% cell survival after 24 hours treatment with aqueous extract of 150×10^3 *P.noctiluca* nematocysts/ml, and 68.9% cell survival after treatment with extract of 75×10^3 nematocysts/ml. Further analysis, including the evaluation of the oxidative stress and considering cellular targets such as apoptotic ways, antioxidant enzymes, ion channel inhibition, ROS production, and cellular signals correlated to protein expression could be further research developments and are thought to be required in order to understand the suitability of extracts from *Pelagia noctiluca* nematocysts as valuables biopharmaceutical substances.

Acknowledgements: The authors wish to thank Dr. Guido Bonello (DISTAV, University of Genova) for his help in the experimental phase of this work.

METAL-TOLERANT PLANT RESPONSE TO SOIL CONTAMINATION

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The global climate is predicted to change drastically over the next century. From literature it is clear that certain climate change scenarios will have effects on metal phytoremediation and plant–microorganism interactions, which are increasingly being explored [1, 2]. The hyperaccumulator plants actively take up large amounts of metals from the soil at concentrations 100–1000-fold higher than in other species, showing no symptoms of phytotoxicity, resulting in a strong metal-hypertolerance [3]. However, there is a lack of knowledge about hyperaccumulators, particularly as regards rhizosphere processes [4]. The aim of this study is to assess the metal-tolerant plant response to abiotic stress by nickel (Ni) through seed germination tests and through the evaluation of potential morpho-functional root alterations using hyperaccumulator and non-hyperaccumulator species under controlled growing conditions. Growing substrates were spiked with Ni at different concentrations. The Image J analysis of roots was used to evaluate parameters like root elongation, surface area and number of lateral roots. Furthermore, Ni-hyperaccumulator plants and soil samples were collected on metalliferous soils to characterize the rhizospheric microbiota. The presence of Ni seems to determine a general decrease of seed germination and a greater root development in hyperaccumulator species, compared to non-hyperaccumulator species. Moreover, the bacterial isolations show a greater number of bacterial colonies in the rhizosphere soils compared to bare soils. The development of an integrated system plant-rhizobiota, using the rhizobiota as a natural metal-chelator could improve metal uptake, alleviating the nickel stress and promoting the recolonization of metal-polluted areas.

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FRIDAY 2 DECEMBER

SESSION 2:
Climate and adaptation mechanisms

ORAL COMMUNICATIONS

FOAMY MACROPHAGE PHENOTYPE: PHYSIOLOGICAL ADAPTIVE RESPONSE OR PATHOLOGICAL ADVERSE EVENT TO INHALED MEDICINES?

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Foamy macrophage (FM) is a term used by pathologists to define an alveolar macrophage with a vacuolated cytoplasmic morphology when viewed by light microscopy. FMs can be observed in nonclinical inhalation toxicology studies, and risk concerns related to their induction concur to high compound attrition rates in the development of potential inhaled medicines. Currently, deficiencies in our knowledge of an objective interpretation of macrophage responses remain a challenge. The purpose of this study was to design a multiparameter *in vitro* assay strategy to characterize distinct mechanisms underlying drug induced foamy appearance. Amiodarone, staurosporine, and polymeric nanoparticles were tested to trigger different FM phenotypes in J774A.1 cells, and treated macrophages were estimated for morphometry, phospholipid accumulation by image analysis [1]. The assay unveiled compound-dependent differences phospholipid accumulation, vacuole number and area, providing also findings on the FM cellular and functional status. Differently to the other inducers, amiodarone increased vacuole size rather than number and resulted in phospholipid accumulation. FM induction did not influence macrophage activation by lipopolysaccharide, but phagocytic capacity was reduced [1]. Although a limited number of compounds was tested, the assay strategy was able to successfully discriminate FM inducers from noninducers. Nevertheless, the approach is not yet sufficiently validated to screen out compounds early in the development process; this requires further research with a larger library of compounds. On the other hand, the present study represents a worthwhile starting point for further development.

Reference:

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NEXT GENERATION SEQUENCING FOR MASSIVE PARALLEL TARGET RESEQUENCING IN OVER-GROWTH SYNDROME

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Overgrowth syndrome are a heterogeneous group of diseases characterized by associated anomalies, mental retardation and increased risk to neoplasia. [1] Their classification is difficult because of genetic heterogeneity. The most important gene are NSD1, EZH2, SETD2, NFIX and they act a key role in regulation of transcription machinery. [2] We validated a protocol for massive parallel sequencing of these genes using *Ion PGM™ System* platform. A cohort of 30 patients with syndromic overgrowth have been clinically selected and molecularly analyzed. Bioinformatics analysis identified 6 out 30 positive patients (20%) with mutations in NFIX gene (4/30), NSD1 (1/30) and EZH2 (1/30). [3] All the identified variants have been confirmed by Sanger sequencing. Our goal was to validate NGS as a diagnostic tool in clinical practice for overgrowth syndromes. Our results show that NGS sequencing is cost effective with respect to Sanger sequencing with high grade of sensibility and specificity.

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CITY EPIDEMIOLOGICAL REPORT AND CLIMATIC AND ENVIRONMENTAL ISSUES

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The City Epidemiological Report (*Referto Epidemiologico Comunale* - REC) gets started in evidence-based manner the path of knowledge on the possible role of particular risk factors *i.e.* socio-economic, environmental, climate, etc. influencing the residents' health level in specific areas (municipal), especially those environmentally sensitive. REC allows a periodic epidemiological check-up, based solely on two types of statistical data in all Italian towns, and referring to the size of the resident population and to the percentage of its overall mortality. Both data will be focused to small territorial units, time period (*i.e.* since 2000), sex and age group. At this stage we do not need any other epidemiological or environmental analysis. In addition, REC does not need to know the type of diseases and the names of cases. In fact, REC is based

solely on the estimation of Standardized Mortality Ratio (SMR) and its confidence limits (CL at 90%). REC quantifies the possible differences (spread) from the standard value (*e.g.* the city of Genoa) of specific areas, periods, age and sex for all-cause mortality. REC also allows you to identify the trends over time for each specific area. Based only on their SMR (and CL 90%) and time trend, the districts were then classified into 5 degrees of risk: 1st: statistically significant reduction (SS); 2nd: NOT statistically significant reduction (NS); 3rd: Normal; 4th: Excess NS; 5th: Excess SS. Both analyses based on temporal trend and spread (*vs* reference) had confirmed the existence of populations already known (and/or perceived) for their particular "quality of life". They have also allowed us to discover and/or assume the existence of new very healthy, and other very sick, districts associated with socio-economic levels, environmental pollution and homogeneous climate level.

EXPLORING MICROBIAL DIVERSITY IN A DYNAMIC AND EXTREME ECOSYSTEM USING THE ION TORRENT TECHNOLOGY

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The Pasvik River is the largest river system in the northern Fennoscandia. The river collects snowmelt, rainwater and groundwater flow, assuming freshwater and brackish features at its inner and outer zones, respectively. Water and sediment samples were collected from 11 sites along the Pasvik river. The DNA library for Ion Torrent sequencing was prepared by PCR, using the engineering primers 27f and 338r. The sequencing process was provided with the Ion 314 chip. The raw data were analyzed using bioinformatics tools to determine the quality criteria of the reads. The bacterial communities in water and sediments were then compared and statistically analyzed (Bray–Curtis similarity analysis, nMDS plots, and PCA). Shannon diversity within the microbial community was greater in sediment than in water samples, being between 1.8 and 2.3 and between 0.5 and 1.7, respectively. The phylum *Proteobacteria* predominated in both water and sediment communities (65.3 and 47.7%, respectively) and was generally followed by the *Bacteroidetes* and *Actinobacteria*. Minor groups generally occurred at percentages between 6.8 and 0.05%. In the past it was believed that polar regions were poor in species. However, modern studies have shown that these places have been successfully colonized. Traditional methods based on cultivation considerably underestimate the diversity, while modern molecular methods have provided a better understanding of the vastness of the prokaryotic diversity [1]. Studies on community structure revealed a remarkable diversity, indicating that psychrophiles have appointed a vast pool of new and not yet cultivated taxa [2].

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WHOLE mRNA SEQUENCING AND TRANSCRIPTOME ASSEMBLY OF *CANDIDA ALBICANS* AND *CANDIDA AFRICANA* UNDER CHLAMYDOSPORE-INDUCING CONDITIONS

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Candida albicans is the most common opportunistic pathogen causing severe fungal infection in humans, especially in immunocompromised patients. Crucial to its success as a pathogen is the substantial dynamism of its genome which readily undergoes genetic changes generating new strains. *Candida africana* is a low virulence biovariant of *C. albicans* possessing peculiar vaginal tropism. This particular strain is unable to form chlamydospores, structures whose biological function is still unknown. In this study we sequenced the whole mRNA and assembled the transcriptomes of a strong *C. albicans* chlamydospore-producing strain (GE1) and a natural chlamydospore-negative *C. africana* strain (CBS11016), under specific experimental conditions. Here we showed the assembly results obtained using two strategies: a *de novo* and a genome-guided approach using Trinity program (v2.2.0). The assembled transcriptomes were evaluated using BUSCO, QUAST and rnaQUAST. *De novo* transcriptomes were assembled in 10681 (*C. albicans*) and 9612 (*C. africana*) contigs (≥200bp) whereas the assemblies produced by genome-guided option consisted of 21656 and 19160 contigs (≥200bp), respectively. Quality analysis showed that the *de novo* approach produced more complete transcriptomes despite the availability of a good reference genome. In conclusion, this study provides general guidance for transcriptome assembly of RNA-Seq data from closely related *Candida* yeast and emphasize the efficacy of the *de novo* assembly also when a sequenced reference genome of reasonable quality exists.

SESSION 3:
Climate changes and emerging pathogens

DOTTORI LECTURE (INVITED)

PANORAMICA SUI PATOGENI EMERGENTI TRASMESSI DA VETTORI IN ITALIA

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L'Italia è una penisola proiettata nel mare Mediterraneo, al centro di esso, ed è sempre stata fulcro di commerci e scambi di persone, beni ed animali, fin dai tempi antichi. In questa ottica Europa Meridionale, Medio Oriente ed Africa sono strettamente interconnessi. Negli anni recenti tuttavia il panorama si è ulteriormente allargato perché la globalizzazione dei commerci, il turismo, l'immigrazione e il mondo del lavoro hanno procurato frequenti contatti anche con altre aree, anche lontane, come i paesi asiatici. Dal punto di vista sanitario è emblematica la recente epidemia di Chikungunya del 2007, che originava dall'India e sono molti gli esempi di insetti infestanti l'ambiente e la vegetazione in Italia che provengono da Africa ed Asia. In Italia dunque sono presenti patogeni trasmessi da vettori la cui diffusione è soggetta a fluttuazioni nel tempo e nello spazio dettate principalmente da fattori climatici, ma anche antropici. Endemici sono ormai Wnv, Usutuv,Tosv, Leishmania, Tbev, Rickettsie trasmesse da zecche etc. Sono da tenere in considerazione anche alcune agenti infettivi negletti, perchè di scarso impatto sanitario (almeno per il momento), ma comunque presenti come Tahv e Batv e naturalmente bisogna tenere alta la guardia nei confronti di virus ed altri agenti esotici che potrebbero, sempre in ragione dei cambiamenti climatici e della globalizzazione, fare incursioni nel nostro paese o perfino stabilirvisi. In primis i virus trasmessi da *Aedes albopictus*, i noti Chikv, Denv e Zikav, quindi i plasmodi della malaria, il Cchfv, il Rvfv e molti altri arbovirus di cui è difficile valutare il rischio di introduzione, perché il fattore principale non è la regione di origine, ma la possibilità che raggiunga altre aree dove per condizioni favorevoli possa svilupparsi e quindi da qui diffondersi ulteriormente, come è avvenuto recentemente per lo Zikav, che, dalle isole del pacifico, solo quando ha raggiunto le americhe, è diventato una minaccia globale. La pericolosità percepita dalle popolazioni riguardo tali minacce è legata a molti elementi emozionali, non sempre oggettivi, tuttavia, valutando i danni in termini effettivi di impatto sullo stato di salute delle popolazioni e sui sistemi economici di paesi spesso svantaggiati, è evidente la gravità di infezioni/malattie come Malaria, Dengue, Chikungunya, Encefalite Giapponese, Febbre Emorragica di Congo Crimea ed altre. Se l'Africa è in qualche modo la culla originaria di moltissimi arbovirus, le maggiori minacce sono arrivate recentemente dall'Asia attraverso la sua capacità di amplificazione e per gli stessi motivi anche dal Centro e Sud America. Una delle cause principali è la ridotta capacità dei sistemi sanitari di molti dei paesi di questi continenti di affrontare e controllare la diffusione dei patogeni nelle popolazioni animali ed umane. Fa sempre più caldo è questo favorisce gli artropodi, vettori compresi, e la globalizzazione, in tutti i suoi aspetti, porta vicino a noi quello che un tempo era lontano e percepito come esotico. I vettori possono essere insetti o aracnidi: insetti sono zanzare e flebotomi, questi ultimi possono trasmettere, in molte parti del mondo, Leishmania e flebovirus, ma sono le zanzare i vettori più importanti. Se è possibile evitare la puntura di zanzare notturne (*Anopheles* e *Culex*), che possono ad esempio veicolare malaria e West Nile, è invece molto difficile evitare l'azione ematofaga delle zanzare diurne (in particolare la zanzara tigre). *Aedes albopictus* (la zanzara tigre di origine asiatica ormai di casa in Italia e in molti altre parti del mondo) è solo una rappresentante del genere Aedes che in Italia riconosce anche altre specie dalla fastidiosa attività serotina (*A. caspius, A. vexans* etc.), ma è sicuramente il vettore più pericoloso per la sua alta adattabilità (oggi in Italia è diventata endofila e punge anche di notte se la luce artificiale è sufficiente), la sua capacità di trasmettere virus pericolosi (Denv, Chikv, Zikav etc.), la sua efficienza nel trovare l'ospite e pungerlo e le difficoltà di attuare una efficace prevenzione in termini di crescita e diffusione sul territorio. In altri continenti sono presenti anche zanzare tigre più pericolose (*Aedes aegypti*) ed altre zanzare tigre si sono già ambientate in Italia (*Aedes koreicus e Aedes japonicus*). Tra gli aracnidi invece bisogna ricordare la zecca dei boschi (*Ixodes ricinus*), che può trasmettere la Tbe e la malattia di Lyme e le zecche del genere Hyalomma (presenti soprattutto sul versante tirrenico di Italia Centrale e Meridionale), che sono potenziali vettori di Cchfv. Le zecche sono vettori molto antichi e ben adattati al ruolo vettoriale, ma i rischi per le persone sono legate alla frequenza di boschi e giardini dove questi aracnidi possono essere presenti, mentre, ripeto, le zanzare ci accompagnano più facilmente in ogni ora del giorno, in ogni luogo, in un arco stagionale che i cambiamenti climatici stanno allungando anno dopo anno. I vettori sono meccanici quando il patogeno viene trattenuto dall'insetto durante l'azione ematofaga su un vertebrato infetto (viremico) e viene poi casualmente rilasciato (vitale e infettivo) durante la successiva attività su un secondo ospite. Naturalmente questa modalità di trasmissione non è molto efficiente, ma avviene in diverse malattie/infezione (Mixomatosi, Lumpy skin dis. etc.). Il vettore è invece considerato invece biologico quando si infetta esso stesso con l'arbovirus o il parassita in questione. Naturalmente questa infezione è il risultato di una lunga evoluzione convergente che dura da migliaia di anni su questo pianeta e che vede la possibilità per uno stesso patogeno di diffondersi adattandosi a specie diverse di serbatoi vertebrati e a specie diverse di vettori (specialmente zanzare) anche nello stesso momento storico. Quando un vettore è biologico il virus, dopo un periodo di incubazione, che dipende soprattutto dalla temperatura esterna visto che gli insetti sono animali a sangue freddo, infetta dapprima l'epitelio intestinale e poi da lì attraversando varie barriere (gli artropodi non hanno anticorpi, ma barriere) può arrivare alle ghiandole salivari. Soltanto se infatti il patogeno è presente nella saliva esso può infettare un vertebrato durante l'azione ematofaga del vettore. La saliva infatti è fondamentale per l'azione stessa in quanto contiene anticoagulanti, anestetici ed altre sostanze, ma a volte anche per il patogeno che senza alcuni suoi elementi non riesce ad infettare il vertebrato (come è dimostrato per Leishmania). Il monitoraggio dei vettori (mediante trappole), può essere utile per rilevare la circolazione di un dato patogeno sul territorio. Se questo è vero per arbovirus come il Wnv che hanno un ciclo selvatico/rurale, è però meno appropriato per quei virus che circolano in ambiti urbani (virus che riconoscono il serbatoio nell'uomo stesso come Denv, Chikv, Zikav etc.): in questi casi il monitoraggio clinico umano è più efficace nell'opera di prevenzione. La prevenzione è infatti lo strumento più importante nel limitare i danni sanitari ed economici in molte e diverse infezioni/malattie trasmesse da vettori.

SESSION 4: Physiopathological and behavioural responses to climate changes

ORAL COMMUNICATIONS

METHODOLOGICAL LIMITS AND BUSINESS BIAS IN ENVIRONMENTAL AND OCCUPATIONAL EPIDEMIOLOGY

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Economical conflict of interest generating bias in environmental and occupational studies represents a growing concern potentially affecting primary prevention policies and public health. We analyzed some environmental and occupational epidemiological studies leading to reassuring and/or negative results, in order to identify recurrent methodological concerns and a possible, voluntary origin *(business bias)* of these limitations. We identified a total of 40 possible methodological limitations theoretically causing an underestimation of the real risk/burden of disease in exposed populations. The most frequent concerns were due to wrong selection of the study design and/or of the control populations, analysis limited to a single (often inadequate) disease/risk factor or with an inadequate time window (follow-up/latency period), lack of the overall assessment of attributable cases, inadequate statistical procedures, incomplete description/discussion of results, lack of consideration of the precaution and prevention principles. In some cases a declared or hidden business bias was detected or might be suspected. *Conclusions:* (i) epidemiological/occupational studies with reassuring/negative results might contain biases potentially limiting their scientific value, with possible negative consequences on primary prevention policies; (ii) the possibility of a *business bias* needs to be carefully explored by "studying the study", also considering declared or concealed conflicts of interests.

EFFECT OF HYDROXYTYROSOL ON GLIAL CELL CULTURE

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Hydroxytyrosol is one of the main phenolic components of olive oil. It is present in the fruit and leaf of the olive (*Olea europaea* L.). This phenolic compound has health benefits and a protective action has been found in preclinical studies against several diseases [1,2]. It shows significant results related with cardiovascular diseases, cancer, and acquired immunodeficiency syndrome (AIDS). Mechanisms of action include potent anti-oxidant and anti-inflammatory effects. Regarding the cancer chemo-preventive activities, it has been shown that Hydroxytyrosol is able to inhibit both initiation and promotion/progression phases of carcinogenesis by preventing the DNA damage induced by different genotoxic molecules and by inhibiting proliferation and inducing apoptosis in different tumors cell lines [3,4]. We exposed C6 rat glioma cells to Hydroxytyrosol (10^{-2}M, 10^{-3}M, 10^{-4}M and 10^{-5}M) for 1h, 6h, 24h, to test the effect of this compound on the cellular viability. The data obtained after the MTT test show a significant decrease in vitality in C6 cells, exposed to concentrations of hydroxytyrosol between 10^{-2}M and 10^{-4}M (from 18% to 30%). These data fit well with the immunolocalization of p53 (protein having anticancer function and playing a role in apoptosis) on the cells treated in the same manner. The immunolocalization is present mainly at the 10^{-2} M Hydroxytyrosol and nuclear staining demonstrates nuclear condensation and fragmentation typical of apoptotic events. This shows that the analyzed molecule exerts a toxic action towards this cell type and probably induces apoptosis phenomenon.

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DEMOGRAPHIC EFFECTS OF CLIMATE CHANGES ON THE POPULATION OF CIVITELLA DEL TRONTO IN THE *"YEAR WITHOUT A SUMMER"*

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In the April of 1815, the eruption of the Tambora volcano (Indonesia) caused in the northern hemisphere a sharp drop in temperature with strong repercussions during the 1816, which was called "The year without a summer". Almost everywhere, the harvests were destroyed. Speculation caused the increase in food prices so the populations suffered the effects of the famine, especially those of the lower classes. Furthermore, at the end of the year 1816 spreads a typhus epidemic lasted nearly nine months. In Civitella del Tronto (TE) the typhus epidemic began in December 1816 and ended in August 1817: during this period the number of deaths increased approximately six times without any difference between the sexes. Deaths of adolescents and adults increased proportionally. The highest number of deaths compared to the pre-crisis period was registered in the villages of the Eastern fractions: mobility in these villages was high, as shown by high values of exogamy, and therefore the greater was the probability of spread of typhus. Because in the documents is not indicated the cause of death it is difficult to distinguish the mortality due to famine from that due to the typhus.

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TRAINING FUTURE ASTRONAUTS TO THE SPACE CLIMATE

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The Universe is full of stars, and each star has at least one planet, the astrophysicists seek water and life in the cosmos. Long periods spent in the cosmos do not have the tempo of life, they are monotonous. The human brain and sensory systems are adapted to the categories of time and space in which they live normally. The philosophical categories of space and time do not exist in the cosmos, they are unique, because contraria sunt complementa. In Karl Jaspers' view, the Existing is not in fact located in time and space, simply there is; being: da sein. The temporal planes are intertwined to lose their characteristic of continuity. In the long term, the cosmic climate produces a sense of fatigue, apathy and mood disorders, with manifestations of "dark mood". The next step is anxiety and depression, dangerous not only for those who suffer from them, but also for the entire crew. Only the willingness to make that key contribution to the objective of scientific research can provide the motivation to endure the many hardships. The dysfunction, whether of people or things, risks compromising the mission. Harmony becomes a key element for success. He or she who exists in the cosmos must establish an equivalence between the energy of his/her mind, determined by the strength of the will, compared to the mass of a physical system that does not belong to him/her, but that is real. It is a rare human ability to know how to control the emotions, to know how to communicate effectively and to remain calm in extreme situations. Awareness for space travellers means having the consciousness that life on Earth is an illusion with regard to the cosmic reality, and intelligence is the ability to adapt. Human life in space stations and the future extraterrestrial human colonization will open up a new era for the anthropology sciences.

BENFANTE LECTURE (INVITED)

WATER AND ECONOMY

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No one would ever think which correlation there is between water and economy, two opposite elements that gravitate between the material and the immaterial, good and evil, life and death. Actually, a thin thread is able to connect these extremes. According to symbolism, Water is represented by an inverted equilateral triangle, as if it wanted to point out the flow going down towards the mouth of a river, towards expansion, towards freedom into the open sea. Symbolically it is portrayed by a Delta resembling womankind. On the contrary, the symbol of economy stands for an equilateral triangle crossed by a line symbolizing Air. Actually, you breathe, feel, perceive Air as you can do with Economy, but you cannot see it, only imagine. It is something abstract, immaterial. On occasion of the Water World Day, celebrated on 22nd March every year, it has been stressed the need to come along a circular economy which through the Water Economy may offer an opportunity to guarantee the safeguard of water sources and improve economy at the same time. If the nations do not act immediately to control the available water sources to the best, some densely populated countries might suffer for the economic development. Multinational companies and banks are acquiring water resources thanks to the politicians 'compliance granting them exploitation rights. The importance of water as a primary public good will be the main profit source and economic assurance for few people. The Mighty have already mapped out the kind of investments which will change the world profile.

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POSTERS

BIOLOGICAL EFFECT OF *OPUNTIA*'S CLADODE ON THE LIVER OF GOLDFISH *CARASSIUS AURATUS* FED WITH A HYPERGLYCEMIC DIET

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Opuntia ficus-indica (L.) originally grown in South America and in Mediterranean area. *Opuntia* conteins several important macromolecules like polyphenols, antioxidants, caroteinoids, that own ipolipidemic, ipoglycidic, antitumoral antibacteric properties. Recent studies show that the blood glucose levels decrease after eating *Opuntia's* cladode. Aim of this study was to prove an evaluation of biological effect of the *Opuntia's* cladodes on the liver of goldfish *Carassius auratus* (L.) fed with a hyperglycemic diet. In this study a total of 16 specimens of *C. auratus* (males and females; weight= 9.2 ± 0.85g) obtained from local supplier, were divided into four groups: hyperglycemic (I), preventive (II), curative (III) and control (IV) [1]. Fish were fed one a day, for 30 days: group I was fed a commercial diet enriched with saccharose (30%); group II was fed a commercial diet enriched with saccharose (30%) and *Opuntia*'s cladodes pulp (30%); group III was fed with fodder enriched with saccharose for 15 days and only with fodder with cladode's pulp for remaining 15 days. Group IV was normal-fed like a control. At the end of experimental period, specimens of each group were anaesthetized with tricaine methanesulphonate (MS-222) and sacrificed. Liver was dissected and prepared in accordance with protocol for optical microscopy. Slides obtained for morphological examining have been processed with Ab-PAS. The hyperglicemic group show a tipical steatosis condition with cellular ballooning. In contrast preventive and curative group tend to a normal morphological condition [2]. The results suggest the beneficial activity of cladode's pulp in the treatment of disorders of hyperglycemic.

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OXIDATIVE STRESS RESPONSE IN ENVIRONMENTAL AND PATHOGENIC *SPOROTHRIX* SPECIES

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The fungal genus *Sporothrix* comprises a group of thermodimorphic pathogens that cause sporotrichosis, a (sub)cutaneous infection of humans and felines. The disease is worldwide distributed and results from two major infection routes: animal transmission and plant origin. *S. schenckii* is the classical pathogen of the group. The infectious species compose a "pathogenic clade" in the genus *Sporothrix*, with *S. brasiliensis*, *S. globosa* and *S. luriei* as members. However, the genus also contains occasional opportunists, such as *S. pallida* and *S. mexicana*, which have a much lower potential to cause infection in mammals. In this study we performed phenotypic tests to investigate on the oxidative stress response among pathogenic and non-pathogenic *Sporothrix* species. A total of 68 strains, isolated from humans, from cats and from the environment were examined. The identity of all strains was verified using partial sequencing of the calmodulin-encoding gene. Subsequently they were inoculated in yeast extract peptone dextrose agar with and without H_2O_2 (6 mM). The results revealed that the non-pathogenic strains (*S. pallida* and *S. mexicana*) were able to grow in the presence of H_2O_2, whereas pathogenic species showed different responses to oxidative stress. All *S. schenckii* strains were unable to grow in YEPD + H_2O_2 whereas 58.8% of *S. brasiliensis* and 66.6% of *S. globosa* strains grew well under these conditions. Overall our data showed that *Sporothrix* species respond in a different manner to oxidative stress and suggest further studies, especially to molecular level, to decipher the gene regulatory network involved in this phenomenon.

RUXOLITINIB: INDUCTION OF SUICIDAL DEATH OF HUMAN ERYTRHOCYTES

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Ruxolitinib is a JAK1/JAK2 inhibitor and it is effectively useful for the treatment of myeloproliferative neoplasm-associated myelofibrosis and other malignancies. It is known that this drug include anemia like side effect. At least in theory, the anemia could result from stimulation of suicidal erythrocyte or eryptosis, which is characterized by cell shrinkage, phospholipid scrambling of the cell membrane with phosphatidylserine exposure to the erythrocyte surface[1]. Eryptosis includes also typical mechanisms contributing to the triggering of this process, these are oxidative stress, Ca^{2+} entry with increase of cytosolic Ca^{2+} activity ([Ca]i) and activation of p38 kinase, a kinase expressed in human erythrocytes and activated by hyperosmotic shock[2]. The present study analyzed whether and how Ruxolitinib induces eryptosis. After 48 hours exposure of human erythrocytes to Ruxolitinib (25 M) was followed by a significant: - decrease cell volume, estimated from foward scatter; - increase of the percentage of phosphatidylserine exposure, estimated from annexin-V-binding in flow cytometry (Annexin-V-FITC, 1:200 dilution); Ruxolitinib did not significantly modify Fluo3-fluorescence and DCFDA fluorescence and the effect of ruxolitinib on annexin-V-binding was not significantly modified by removal of extracellular Ca^{2+}. The effect of ruxolitinib on annexin-V-binding was, however, significantly blunted by the p38 MAP kinase inhibitor SB203580 and virtually abolished by the p38 MAP kinase inhibitor skepinone. So Ruxolitinib triggers cell shrinkage and

phospholipid scrambling of the erythrocyte cell membrane, an effect in part requiring p38 MAP kinase activity.

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PRELIMINARY INVESTIGATION OF AN INTERTIDAL ZONE'S FAUNAL ASSEMBLAGE (BEACH ROCK, R.N.O. CAPO PELORO, NE SICILY)

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The so-named "beach-rock", is a peculiar sedimentary formation commonly appearing as a layered deposit inclined towards the sea. Its units originate under a thin cover of sediment and generally overlying unconsolidated sand. This formation is a hard substratum of natural origin, which represents a transition between the terrestrial and the marine environments. Beach rock acts also as a resistant barrier to coastal erosion. The Messina's beach rock is a sedimentary formation, also present in many other parts of Italy, which is located in the north-eastern part of the island, included in the oriented natural reserve of Capo Peloro. For its characteristics and position this zone creates a very particular ecosystem, representing part of the intertidal zone located between Ganzirri (38°25'69''N, 15°61'24''E) and Faro (38°15'43"N, 15°38'13"E). In some parts of the beach rock tidal ponds occur, and due to their jagged shape the water from the sea flows in. For this reason, the different ponds have been sorted in three types: 1. Closed, 2. Open 3. Semi open. In this research, we investigated both water variables and the faunal assemblages (benthic fauna and fishes). The water parameters reach a wide range of fluctuation, also in few hours, depending on both ponds type and weather/sea conditions. Despite this variability, biocenosis composition are various and heterogeneous, and a lot of taxa are present. In this preliminary investigation has been noted a very important feature: juveniles represent the 90% of fishes recorded. For this reason, can be assumed that these environments can represent a natural nursery zone and have to be protected more strictly.

PROKARYOTIC COMMUNITY OF SUBTIDAL SANDY SEDIMENTS IN THE KONGSFJORDEN (SVALBARD ISLANDS, NORWAY)

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The Kongsfjorden (79° N, 12° E) is a glacial open fjord located on the west coast of the Svalbard Archipelago. It is about 20 km long and its width varies from 4 to 10 km. The fjord, whose volume was estimated at 29.4 km^3, has different depth zones: the outer part, in connection with the ocean, is the deepest, while the inner area, which is near the glacier, is approximately around 100 m deep. In this study, subtidal sandy sediment samples were collected along a coastal transect with the aim to investigate the prokaryotic abundance and diversity by flow cytometry and Ion Torrent, respectively. The total prokaryotic abundance was on average 6.6±4.3 $x10^7$ cells/g, with higher values assessed in sediments collected at the glacier front area. Different bacterial phyla were retrieved from sediment samples, with the predominance of *Proteobacteria*, followed by *Bacteroidetes* and *Actinobacteria*. Minor groups occurred (*i.e. Chlorobi, Chloroflexi, Firmicutes, Gemmatimonadates, Nitrospirae, Acidobacteria* and *Cyanobacteria*). Our results demonstrated a direct relation between the prokaryotic community composition and the freshwater gradient formation, owing to ice melting and release of a greater concentration of organic matter in the inner site (A) than in the open sea site (D). In conclusion, this study provides further information on the prokaryotic community inhabiting the Kongsfjorden, contributing to the existing knowledge on microbial ecology dynamics in extreme cold environments.

DETECTION OF LIPOLYTIC ACTIVITY BY PLATE ASSAY OF ENVIRONMENTAL YEASTS ISOLATED IN MOROCCO

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Lipases (triacylglycerol hydrolases, E.C. 3.1.1.3) are a class of hydrolases which catalyze the hydrolysis of triglycerides to glycerol and free fatty acids. These enzymes are also able to catalyze the hydrolysis and transesterification of other esters including the synthesis of these molecules. In the light of the different applications, such as pharmaceutical, food and leather industries, it is of great interest to seek new fungal sources of lipases. Yeasts isolated from environmental samples (Olive pomace, black olive, rancid butter, rotten strawberry and rotten orange), taken from two different regions of Morocco: Meknes (Coordinates: 33°53 42 N 5°33 17 W) and Beni Mellal (Coordinates: 32°20 22 N 6°21 39 W), were tested for their lipase and esterase production ability using plate assays. The tests were performed using CaCl2 Tween 20 agar and rhodamine olive-oil agar, respectively, for esterase and lipase activity detection. Eleven yeasts showed a zone of precipitation formed around the inoculated wells on Tween agar plates, indicating the esterase production. Three of these yeasts showed an intense orange fluorescence around the inoculated wells on rhodamine olive-oil agar,

under UV lamp, indicating the lipase production. Further investigations are ongoing in our laboratory to identify the selected isolates by molecular methods and to optimize the enzyme production by liquid fermentation.

MOLECULAR IDENTIFICATION OF LIPASE PRODUCING YEASTS ISOLATED FROM MOROCCAN STRAWBERRY AND OLIVE POMACE

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Three yeast isolates from Moroccan rotten strawberry and olive pomace, manifesting lipase activity after screening were characterised by microscopic observation and biochemical tests to decipher their physiological characteristics. Based upon colony morphology on growth medium, microscopic observation and biochemical tests isolated yeasts can be allocated to specific genera. Nevertheless, these techniques do not always allow to correctly identifying fungal species. Consequently, a molecular identification method such as ITS-sequencing has been proven to be useful for yeasts identification. Therefore it was used for final characterisation and phylogenetics studies of our three strong lipase fungal producers. Preliminary results of ITS sequencing revealed that the LE154 strain belonged to *Rhodosporidium babjevae*, whereas the other two, LE170 and LE171, were identified as *Rhodotorula sp.* and *kluyveromyces marxianus*, respectively. Further investigations are ongoing, in our laboratory, for supplementary tests of molecular identification using other markers and for optimization of factors influencing the lipase production (temperature, pH,...) by liquid fermentation.

THE EFFECTS OF GLYPHOSATE ON EARLY LIFE STAGES OF COMMON CARP (*CYPRINUS CARPIO*) AND ZEBRAFISH (*DANIO RERIO*)

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Glyphosate (*N*-(phosphonomethyl) glycine) is an active substance of many herbicides. According to literature studies, glyphosate residues and their metabolites have been commonly detected in surface and ground waters and toxicological reports confirmed negative effects on living organisms [1, 2]. Toxicity tests were performed with common carp (*Cyprinus carpio*) and zebrafish (*Danio rerio*) embryos in order to assess acute toxicity of glyphosate. Fertilized eggs, at the latest at the 16-cell stage, were exposed glyphosate in concentrations of 0.005, 0.050, 5, 10 and 50 mg/l. Lethal endpoints were recorded and, in addition, other sublethal endpoints such as hatching rate, formation of somites, development of eyes, spontaneous movement, heartbeat/blood circulation, pigmentation and oedema were recorded to indicate the mode of action of the toxic compound. The assay also included screening for developmental disorders to indicate teratogenic effects according to Nagel [3]. Hatching retardation in common carp was observed among the experimental groups. On the other hand, hatching stimulation was observed in zebrafish. Delay in embryos development and morphological anomalies such as hematomas, pigmentation and oedema were observed in the test with common carp in all test concentrations. On the other hand, only few morphological anomalies and delay in development were observed in the test with zebrafish, especially in the highest concentrations. The toxicity test with glyphosate performed on common carp and zebrafish revealed strong negative effects on early life stages of fish. Based on our results, early life stages of common carp are more sensitive in comparison to zebrafish to the toxic action of glyphosate.

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MICROSCOPIC INTERACTION BETWEEN *AXINELLA POLYPOIDES* (SCHMIDT, 1862) AND SMALL EXOGENOUS INCLUSIONS

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Chondrosia reniformis (Nardo, 1847) is a Demospongiae widely studied for its peculiarities: the lack of spicules, the huge collagen production strengthening the body, the selective engulfment of exogenous silica particles and their dissolution releasing silicon ions [1]. The presence of aquaporin (AQP)-expressing cells adherent to the silica grain surface was linked to this process [2]. Conversely, the widely studied demospongiae *Axinella polypoides* Schmidt, 1862 [3] possesses spicules and produces only a small amount of collagen. Interestingly, in some species of the genus *Axinella* was demonstrated an uptake of dissolved Si from sea water resembling an enzymatic kinetics with the maximum efficiency at [Si] two orders of magnitude higher

than the [Si] measured in natural sponge habitats [4]. In *A. polypoides* histological sections, we observed the presence of exogenous grains surrounded by adherent cells. We here start to describe the interactions between this sponge and the small grain inclusions. *A. polypoides* samples were collected in the area of Portofino (Italy) at depths of 20 m, fixed in 4% paraformaldehyde, Paraplast embedded, cut into 6- m sections, and stained using Masson's Trichrome and Picrosirius Red for collagen. The presence of AQP-like immunoreactivity was detected using commercial rabbit polyclonal anti-AQP1, 2, 3, 4, 8 and 9. Then, Alexa 488-conjugated chicken anti-rabbit antibodies were used for fluorescence staining. Omission of primary antisera was also performed. Cell nuclei were DAPI stained. Sections were visualized by a Leica DMRB light and epifluorescence microscope, equipped with cross polar and Nomarski filters. A detectable amount of collagen was observed in histological slides only in the proximity of spicules, and some grains were scattered in the same zones. The cross polar microscope allowed to observe that the whole grains or part of them rotated the plane of polarization. Cells were always present on the grain surface. AQP8- and AQP2-like immunoreactivity (IR) was observed on these adherent cells; AQP2-like IR was also present in the coanocytes. Our data demonstrate that microscopic optical-active cell-enveloped particles are present in *A. polypoides*. These cells show AQP-like IR resembling that of the cells around quartz particles in *C. reniformis*. The optical activity of the particles in *A. polypoides* is compatible with a siliceous composition, although this is not yet demonstrated. The presence of cells surrounding the exogenous material is indicative of an active interaction. Since in the case of *C. reniformis*, this situation is related to the dissolution of the crystalline quartz grains, further investigations are needed to clarify the role of the grain-surrounding cells also in *A. polypoides*.

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MORPHOLOGICAL HISTOCHEMICAL AND IMMUNOHISTOCHEMICAL STUDY OF RECTAL GLAND OF *SCYLIORHINUS CANICULA*

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In this study we describe the morphology, histochemistry and immunohistochemistry of rectal gland of *Scyliorhinus canicula*, an important osmoregulatory organ of elasmobranch fish. This organ has function to remove excess salts. The animals were kept in the Strait of Messina, transferred in large tanks equipped with running sea water for one week before the sacrifice. Specimens of *S. canicula* were anaesthetized with MS-222 to 0.01%, and fragments from rectal gland were taken. The tissues were fixed in 4% paraformaldehyde in phosphate buffered saline (PBS), dehydrated in graded ethanol, cleared in xylene, embedded in Paraplast and cut into 5 µm sections. For morphological analysis, of salt gland paraffin tissue sections were stained with haematoxylin and eosin (H / E), Galgano's trichrome and Mallory's trichrome; while for examining histochemical other sections, were stained with PAS reaction, which has marked intensely the basolateral membrane of the principal cells, demonstrating their absorbent function. To further examine the secretory nature of the various cell types we have used the following specific lectins: PNA and WGA, that have marked the apical membrane of the same principal cells, indicating gland secretory function. The immunohistochemical investigations were carried using indirect method of peroxidase to detect the presence of vasoactive intestinal peptide (VIP) and substance P, which have marked numerous nerve fibers both of the capsule that of the parenchyma of the rectal gland; immunofluorescence labelling with a-smooth muscle actin (a-SMA) has revealed the presence of smooth muscle cells in the capsule of the rectal gland.

TOWARD *KIT* AND *RXFP2* GENES SNPS DISCOVERY IN GOAT (*CAPRA HIRCUS*) USING NGS TECHNOLOGY APPROACH

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Goats (*Capra hircus*) are spread worldwide following human migrations and commercial trade and are rapidly adapted to a very wide range of environmental conditions. Because of their important role in the production of milk, meat and fiber (*e.g.*, cashmere wool), the genetic diversity of many goat populations is changing. Secondary characters, like shape of the horns and coat color, are commonly used to discriminate among breeds, and two genes (*KIT* and *RXFP2)* are well known to be involved in these phenotypes. Here we present SNPs discovery using massively parallel sequencing approach, comparing 6 breeds. Blood samples from 36 goats (Derivata di Siria, Maltese, Girgentana, Camosciata delle Alpi, Argentata dell'Etna, Saanen) were used to extract genomic DNA for library preparation and sequencing with the Ion Torrent PGM machine. Generated 1,242,457 raw reads were analyzed using Torrent Suite (v.4.2.1), with modules TMAP for the mapping on the reference sequences (Accession: NC_030813, NC_030819) and TVC for the SNPs variant calling. A total number of 284 variants (~93 each breed) were obtained, 16 of which were shared between all breeds; of these, one was found in heterozygosity with a second alternative variant only in Derivata di Siria and Girgentana. Remaining 258 unshared SNPs (90,84%) highlight the large variability between these breeds. Our results confirmed the high genetic variability in goat's population that represent a crucial point to monitor genetic erosion and to evaluate the conservation of the Italian's goat breeds.

SEQUENCING AND PRELIMINARY ANALYSIS OF GENES INVOLVED IN IRON METABOLISM IN *CANDIDA AFRICANA* CBS11016 STRAIN

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In this study we report a molecular characterization including differential gene expression analysis of the transcription factor (AFT2) and other genes involved in the uptake (FTR1) and oxidation (FET3, FET31, FET33 FET34, FET99) of iron in *C. africana*, a less pathogenic biovariant of the well-known human pathogen *C. albicans*. The type strain *C. africana* CBS11016 and the *C. albicans* WO-1 strain were used for specific phenotypic and genetic analysis. For phenotypic tests, the strains were grown on YPD agar containing different concentrations (80,150, 200 and 500 µM) of bathophenanthrolinedisulfonate (BPS). From each strain, DNA and total RNA were extracted according to standard protocols and used for sequencing and qPCR analysis of the genes listed above. The results revealed that CBS11016 and WO-1 strains were able to growth in YPD+80 µM BPS, but at higher concentrations *C. africana* showed a reduced growth and a hyperfilamentous phenotype if compared to *C. albicans*. DNA sequence analysis showed a number of characteristic nucleotide substitutions in all examined genes. Moreover, FET34 and AFT2 genes showed also a specific deletion of three and six nucleotides respectively. No transcriptional differences were observed among the two *Candida* strains examined. Only the FET99 gene was significantly down-regulated in the CBS11016 strain. Unlike *C. albicans*, *C. africana* shows a retarded growth when cultured in iron deficient conditions and this appears not be exclusively linked to genes involved in the iron metabolism. Therefore further analysis are needed to elucidate the molecular network related to iron utilization in *C. africana*.

CLIMATE CHANGE AND FOOD SAFETY: CITIZEN SCIENCE FOR MONITORING THE PRESENCE OF TOXIC ALIEN FISH SPECIES IN ITALIAN WATERS

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Global warming is transforming the Mediterranean Sea as a result of the increase of the sea water temperature. Exotic tropical species, originating from the Indo-Pacific area and entering via the Suez Canal ("Lessepsian" migration) are spreading (tropicalization). Some of these "alien" species, such as those belonging to the family Tetraodontidae, or "puffer fish", are toxic, as they are able to accumulate a potentially lethal neurotoxin. According to the available reports, 3 species of puffer fish are now present in Italian waters: *Lagocephalus sceleratus*, *Lagocephalus lagocephalus* and *Sphoeroides pachygaster*. The project "*Climate change and food safety: molecular, microbiological and toxicological analysis on toxic fish species in the Tyrrhenian Sea*" led by the Istituto Zooprofilattico Sperimentale of Lazio and Tuscany in partnership with FishLab, Department of Veterinary Sciences, University of Pisa and the Veterinary Services and Animal Health, Ministry of Agriculture & Rural Development, Israel, is funded by the Ministry of Health. It aims to monitor the occurrence of toxic fish species along the Tyrrhenian Sea coast and to characterize them under a molecular, microbiological and toxicological profile. The first part of the project was dedicated to dissemination activities using dedicated informational brochures and posters, a report form, a Facebook page and a specific section on the FishLab site, in addition to newspaper articles, TV interviews and meetings with fishermen, divers and control authorities. All these activities were aimed at creating a network for the collection of reports and samples, to update the presence and toxicity of these species, allowing a better assessment of the associated risk.

VARIATION OF TEMPERATURE IN A COASTAL PROTECTED AREA (GANZIRRI LAGOON, ME) DURING THE LAST HALF CENTURY: GLOBAL WARMING?

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Brackish waters are highly productive ecosystems, in which more than 90% of the world's marine and freshwater biodiversity is present. These environments such as lagoons, bays, estuaries, coastal lakes and ponds are subject to high fluctuations of chemical, physical and trophic composition. Lagoons, particularly, are highly productive coastal environments that provide many important features to local communities and natural conservation, such as: species protection, reproduction, nursery zones and many others. The Ganzirri lagoon, formed between 3000 and 2500 BC, is located at sea level. It is divided in two zones: SW and NE, which differ principally for their bathymetry, morphology of the bottom, and physic-chemical characteristics of the waters. This lagoon is a transitional environment presenting shallow waters (maximum depth=6.5m, average depth=1m), and slow water circulation. It is a marine formation but receives the input of fresh water from numerous sources. It is connected to the Ionian Sea and to the Faro Lake by channels. Beside from these exchanges with the sea, the variation of temperature depends mainly on the atmospheric conditions. This study comprehends both literature's collection of temperature data, and a year of *in situ* measurements. In this research we compared the temperatures of the 1953 with other two periods (1979-1999 and 2000-2016). The collected data, showed a clear increase of temperature during the winter months since the early 50's, by 3°C up to 1999 and about 4°C in the last two decades. This increase of temperature could be linked to the global warming, which has been taking place in our country in the last half century.

MOLECULAR INVESTIGATION OF STRAINS OF *CANDIDA* SPP., ISOLATED FROM THE ORAL CAVITY OF NEUROLOGICAL PATIENTS WITH OR WITHOUT GENETIC DISORDERS

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Candida genus comprises about 300 different species of which over 40 are pathogenic for man and other mammals. *C. albicans* is the most important species of the group that asymptomatically colonizes the oral cavity, gastrointestinal tract, vagina and skin of healthy humans. The aim of this study was to analyze the oral *Candida* colonization and to assess the prevalence of different *Candida* species in patients with different neurological disorders. In total, 63 yeast isolates were obtained from the oral cavity of 46 patients. All yeasts were initially identified using CHROMagar *Candida* and ID32 C system. Subsequently their identity was confirmed by species-specific PCRs and ITS-sequencing. Molecular identification of "Generally Purpose Genotype" (GPG) strains among *C. albicans* isolates was also carried out. The results showed a high frequency of *C. albicans* (77,7 %) followed by *C. glabrata* (6,3 %), *C. krusei* (4,8 %), *C. dubliniensis* (3,2 %), *C. kefyr* (3,2 %), *C. guilliermondii* (3,2 %) and. *C. pararugosa* (1,6 %) was also isolated. No GPG strains were found in this study. This study, although confirms *C. albicans* as primary colonizer of the oral cavity of humans, it also revealed a considerable heterogeneity of *Candida* non-*albicans* species in our particular population of patients.

PROKARYOTIC DISTRIBUTION ALONG A PH GRADIENT AT SHALLOW HYDROTHERMAL VENT OF VULCANO ISLAND (ITALY)

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Shallow hydrothermal systems evoke primordial conditions and represent models to investigate the effects of the ocean acidification and warming on coastal environments. Surface sediment samples were collected along a pH gradient, at increasing distance from the acidic primary vent (PV). Prokaryotic community abundance and diversity were examined by 16S rRNA Fluorescence *in situ* Hybridization and PCR-Denaturing Gradient Gel Electrophoresis (DGGE), respectively. *Bacteria* numerically dominated over *Archaea* in all sites, however the archaeal contribution to the entire prokaryotic community increased at PV, where the lowest pH value was recorded. As emerged by DGGE pattern analyses, bacterial and archaeal richness and diversity (Shannon index) increased in the vicinity of PV, indicating that venting conditions result in high diversity of prokaryotic communities. Phylogenetic analyses revealed that *Epsilonproteobacteria* (chemosynthetic producers) prevailed at PV, whereas *Cyanobacteria* (photosynthetic producers) and *Bacteroidetes* (heterotrophs able to degrade complex biopolymers) dominated at increasing distance from PV, according with the increasing of pH. All achaeal sequences from DGGE bands were affiliated with uncultured members of *Euryarchaeota* and *Crenarchaeota*. Differently from *Euryarchaeota*, *Crenarchaeota* increased with the proximity to the acidic vent, determining a marked shift in the archaeal population composition. Our results revealed the contrasting effects of venting on the benthic bacterial and archaeal communities. The proximity to the principal vent, with a concomitant pH decreasing, seems to provide trophic and ecological interactions resulting in assemblages of different phylogenetic and metabolic microorganisms.

ANTIVIRAL AND IMMUNOMODULATORY EFFECTS OF BACTERIAL EXOPOLYMERS OF SHALLOW MARINE VENTS ORIGIN

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Herpes simplex virus type 2 (HSV-2) is responsible of the common and ever-increasing viral infections in humans. The shallow marine vents of the Eolian Islands (Italy) are sources of almost unexplored extremophiles producing unexploited biomolecules with promising pharmaceutical applications. In this study we compare the antiviral and immunomodulatory activity against HSV-2 of two exopolymers, a poly-γ-glutamic acid (γ-PGA) and an exopolysaccharide (EPS), produced by two different *Bacillus* strains bacilli, *B. horneckiae* APA [1] and *B. licheniformis* T14 [2], isolated from vents off Panarea Island (Italy). Cytotoxicity test of γ-PGA-APA and EPS1-T14 was performed both on human peripheral blood mononuclear cells (PBMC) and WISH cells. Biopolymers, wich resulted not cytotoxic (≤400 g/ml), significantly hindered the HSV-2 replication in PBMC. The Th1-type cytokines production (interferon γ, INF-γ; interferon α, INF-α; tumor necrosis factor, TNF-α; interleukins IL-12 and IL-18) that stimulate the immune cell responses, and of Th2-type anti-inflammatory cytokines (IL-4 and IL-10) were evaluated in PBMC supernatants. γ-PGA-APA showed a higher Th1-type cytokines production than EPS1-T14. PBMC infected with HSV-2 and treated with biopolymers resulted in the production of lower amounts of IL-4 and IL-10, than those produced by HSV-2 alone. Moreover, γ-PGA-APA induced a lower production of Th2-type cytokines by infected PBMC than EPS1-T14. *Conclusions*: γ-PGA-APA and EPS1-T14 biopolymers could be used as immunomodulatory agents in immunocompromised host.

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MULTIPLE BIOASSAYS TO EVALUATE ECOTOXICITY OF POLLUTED SUBSTRATES

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Potential ecotoxicity of three tunnel excavation materials conditioned with two different foaming conditioners (P and F, respectively) and lubricant were screened using a multi-end-point bioassay approach. A modified OECD artificial soil was used as control soil (C) to screen only the effect of each conditioner. Acute toxicity bioassays were conducted with a selected set of test species (*Dictyostelium discoideum, Daphnia magna, Hordeum vulgare* and *Lactuca sativa*). Tests were done immediately after adding conditioners (t_0), and after one (t_7) and two weeks (t_{14}) from P and F addition. Although substrates showed no toxic effect, the sensitivity of the test species and the toxicity endpoints varied. The *D. discoideum* were not affected by F exposure, showing morphology and fission rate rhythm (FRR) similar to that of C. Conversely, at t_0 P inhibits the FRR, while t_7 and t_{14} were comparable with C for cell division and morphology. The *D. magna* values of immobilization percentage (I%) were always lower than 10% (*i.e.*, comparable with C), with the exception of one substrate+P in which I=10%. The germination index of *L. sativa* and *H. vulgare* ranged around 80% (*i.e.*, no phytotoxicity) and the same trend was observed for mean root length. No significant time-effect (*i.e.*, increasing conditioner biodegradation) were recorded with the exception of one substrates, with values that turned high at t_{14}. Thus, substrates+conditioners were not toxic but with different sensitivity showed by multiple bioassays that revealed that this approach is suitable to be applied for a quick and exhaustive screening of soil toxicity.

SPONGE-ASSOCIATED ANTARCTIC BACTERIA: DIVERSITY AND BIOTECHNOLOGICAL POTENTIAL

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Sponges provide important habitat for a community of associated organisms with bacteria that frequently colonize outer surfaces as well as the interstices of ostia and oscula, constituting over 40% of the host mesohyl biomass, even in Antarctica where sponges dominate vast areas of the Antarctic shelves. Among extremophiles, cold-adapted bacteria from Polar habitats could represent a potential source of novel biomolecules with unusual functional activities. Despite this, their biotechnological potential remains relatively unexplored. In this context, a total of 884 cold-adapted bacterial strains from 12 Antarctic sponge species were identified and screened for potential biotechnological applications. Isolates were clustered in 45 Operational Taxonomic Units (OTUs) which were phylogenetic affiliated to five main taxa, as follows: Gammaproteobacteria (57.6%), Actinobacteria (19.5%), CF group of Bacteroidetes (16.9%), Alphaproteobacteria (4.8%) and Firmicutes (1.2%). The genera *Pseudoalteromonas* (342 isolates), *Arthrobacter* (124 isolates) and *Gillisia* (115 isolates) were particularly abundant among isolates. The Alphaproteobacteria and Firmicutes were mainly represented by members in the genera *Roseovarius* and *Oceanobacillus*, respectively. The OTUs *Pseudoalteromonas* SER45, *Arthrobacter* SER44 and *Psychrobacter* SER48 were generally shared among sponge species. The cluster analysis carried out on bacterial isolates highlighted similarities/differences among the bacterial community associated with the analyzed Antarctic sponges, also in relation to the sampling site. Antibacterial activity and production of exopolysaccharides (EPS) were showed by 119 and 110 isolates, respectively, mainly affiliated to the genus *Pseudoalteromonas*. Further in depth analyses were carried out for EPS iper-producing isolates belonging to the genera *Shewanella, Colwellia, Psychroserpens* and *Winogradskyella.*

MOLECULAR EPIDEMIOLOGY OF PATHOGENIC *CANDIDA* SPECIES IN HOSPITAL ENVIRONMENTS

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The rise of *Candida* bloodstream infections (BSI) among hospitalized patients is a fact widely confirmed by many studies worldwide. In Italy *C. albicans* and non-albicans species cause around 50% of BSIs each and *C. parapsilosis* has emerged as an important cause of candidemia especially in southern Italian hospitals. The aim of this study was to describe the pattern of fungi associated with hospital environments (air, medical equipment and various surfaces) in one of the most important structures of South Italy in the treatment of patients with neurological diseases. A total of 271 yeasts were recovered and identified using phenotypic and molecular methods . Most of them (58%) belonged to *Candida* species and *C. parapsilosis* was the most encountered species followed by *C. glabrata*, *C. albicans*, *C. tropicalis* and *C. krusei*. The remaining 42% of the yeast isolates belonged to different fungal Genera (*Rhodotorula*, *Aureobasidium*, *Saccharomyces* e *Blastoschizomyces*). This study confirms that *C. parapsilosis* is particularly prevalent in Italian hospitals where contaminates various surfaces including air and medical devices. Therefore, the implementation of surveillance and control measures is imperative to prevent the spread of nosocomial fungal infections among hospitalized patients.

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IN VITRO ACUTE TOXICITY OF CADMIUM AND ZINC IN HAEMOLYMPH AND DIGESTIVE CELLS OF *MYTILUS GALLOPROVINCIALIS*

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Although heavy metals in trace concentrations are normal constituents of marine organisms, the continuing and increasing release of man's wastes into the marine environment will affect the characteristics of water, sediments, flora and fauna, and may prove toxic not only to marine life but also to man. Contaminants accumulation in various fish and other marine species provides an estimate of integrated metal exposure (Fazio *et al.*, 2014). Mussels are used worldwide as bioindicators, not only for their filtering habits, but also for their low metabolism, ability to bioaccumulate most pollutants and their important ecological role in aquatic environments (Torre *et al.*, 2013). For all these reasons, in this study we evaluated the effects of cadmium chloride and zinc chloride on haemocyte and digestive cells of *Mytilus galloprovincialis*. Control and two experimental groups (0.5 mg/l and 1 mg/l) were used in the test for both metals. After 24h, 72h and 7 days haemolymph was collected and the digestive glands were isolated. To assess toxic effects of cadmium chloride and zinc chloride on haemocytes and digestive cells the viability assays and the rate of cytotoxicity (Lactate Dehydrogenase Assay – LDH) were performed. The results of our study showed that zinc chloride, although it is essential for the life of cells, caused marked cytotoxic effects at the concentrations tested by us, which growth with increasing concentration and the time of exposure. Cadmium chloride in comparison with zinc chloride is less toxic but showed a significant tissue damage more visible in haemocytes than in digestive glands. Future investigations will be necessary to understand the metabolomic link with short-time exposure of heavy metals.

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ANTIBIOFILM ACTIVITY OF A BIOPOLYMER PRODUCED BY THE LUMINESCENT *VIBRIO HARVEYI* STRAIN G5

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Bacterial biofilms are cellular aggregates or surface-attached microorganisms composed by hydrated extracellular polymeric matrix. The development of anti-biofilm strategies is of major interest in contrasting bacterial pathogenic biofilms. The aims of this study are: i) to characterize a new luminescent strain G5 isolated from Faro lake (Italy) and ii) to evaluate its biopolymer (BP-G5) for anti-biofilm activity against multi-resistant clinical strains *Escherichia coli* 463 and *Klebsiella pneumonia* 2659. Strain G5 was characterized by phenotypic and genotypic tests. To obtain biopolymer, strain G5 was grown in Marine Broth added with glucose (3% w/v) under its optimal growth conditions. The biopolymer was recovered as described previously[1]. The antibiofilm activity of BP-G5 at different concentration ranging from 25 to 400 μg ml^{-1} was evaluated spectrophotometrically in "96well-microplates" [1]. Strain G5 was strictly related to *Vibrio harveyii* ATTC 14126. The yield of biopolymer was 198 mg/1 after 72h of incubation. BP-G5 showed a strong reduction of the biofilm formation without showing antibacterial activity. In presence of BP-G5 at the concentration of 100 g ml^{1} the biofilms produced by *E. coli* 463 and *K. pneumonia* 2659 were inhibited of 43% and 65% respectively. *Conclusions:* The novel BP-G5 is a water-soluble exopolymer able to prevent biofilm formation and may represent a new promising therapeutic strategy for fighting bacterial biofilm-associated infections.

Reference:

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FORENSIC ANALYSIS OF SAMPLES OF CONFISCATED ABUSE SUBSTANCES, CARRIED OUT IN THE LABORATORY OF ANALYSIS AND DRUGS OF THE CARABINIERI, MILITARY STATION "CARINI", PALERMO

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The aim of this study was to define some methods of qualitative and quantitative analysis for technical verification of alleged drugs confiscated by the stations of the Carabinieri in Palermo and Trapani provinces. Observation concerned: the quantity of the confiscated material, the quantity of the active principle, the cutting substances and the consumption in adult and minor population. The Carabinieri ask for analyses of confiscated drugs to the L.A.S.S. laboratory, where the samples are added with the suitable standard and put to ultrasound. Then, the solution is analyzed with gas cromatography and gas mass spectrometry. In 2015 there were 1,000 analysed finds out of 1,454 total finds. The net weight was: 1102,03 g heroin, 15724,5 g hashish, 40812,7 g marijuana, 18,396 g MDMA, 902,1 g methadone and 0,32721 g LSD. The net weight of the active principle was: 907,3 g cocaine; 8,7 g heroin; 4126,7 g hashish; 3829,2 g marijuana; 19,35 g MDMA; 7,26 g methadone and 0,00112 g LSD. Cannabis is the illegal substance used by people of all age and the first step towards other more dangerous drugs. Heroin is cut, while cocaine undergoes less dilution or adulteration. Ecstasy and MDMA are associated with nightlife and consumed together with alcohol. Drug abuse among young people is still an issue; with respect to some substances, it is even increasing.

RISK ASSESSMENT OF EXPOSURE TO CHEMICAL AGENTS IN THE WORKPLACE

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The study in question is the chemical risk assessment relating to chemicals used at the SERIMANT Military Authority of

Palermo, Supplies and Maintenance Section, in order to ensure the protection of the safety and health of workers. Chemicals used in the barracks were analyzed; data collected anonymously from 32 male workers exposed to test substances for at least five years; their work tasks analyzed; established health and laboratory findings extrapolated from medical records of each worker, as well as search for specific representative metabolites of intoxication to the relevant substances; compared the different indicators of toxicity parameters and processed statistics. The levels of 1- hydroxypyrene in the urine of each exposed worker is significantly lower than the reference limit value, therefore, none of the workers show intoxication of Pyrene (IPA); the same can be said for Hippuric Acid, metabolite of Xylene and Metilippurico Acid, metabolite of Toluene. There have been cases of poisoning by Arsenic: the urinary arsenic values found are not correlated to occupational exposure. However, regarding Chromium, it is seen that a category of workers have values of this metal slightly higher than the threshold value: probably related to professional type exposure. The study compared the clinical data and statistics conducted on a group of exposed Serimant workers and shows the risk of poisoning related to the use of assessed chemicals is very low, through the adoption of preventive and protective measures.

AMOUNT OF ERBITUX USED IN THE HOSPITAL "CIVICO - DI CRISTINA - BENFRATELLI", PALERMO

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Erbitux (Cetuximab) is indicated for the treatment of patients with epidermal growth factor receptor (EGFR)-expressing, KRAS wild-type metastatic colorectal cancer and without KRAS mutations (wild type). Cetuximab is a chimeric monoclonal IgG1 antibody directed against the EGFR. It blocks binding of endogenous EGFR ligands resulting in inhibition of the function of the receptor and induces the internalization of EGFR, which can lead to down-regulation of EGFR. Erbitux may be administered via a gravity drip, an infusion pump or a syringe pump. The first administration should be administered in 120 minutes and subsequent over 60 minutes. Precautions:It is stored at a temperature between 2°C and 8°C. Prior to the first infusion, patients must receive premedication (antihistamine and a corticosteroid) at least 1 hour before administration of cetuximab. Due to physico-chemical incompatibility, must not be mixed with other medicines. At the Hospital ARNAS "Civico-Di Cristina-Benfratelli" of Palermo were dispensed in the year 2013 130182 mg, in the 2014 147125 mg, in the 2015 117060 mg and in the 2016 (until November) 71964 mg. The highest consumption has had in the year 2014. Following the discovery of RAS subgroups, it is seen that Erbitux works best on K-RAS subgroup, then, over the years, the SOC has varied according to the state determination mutated or non-mutated K-RAS gene. From 2015, with the marketing of Panitumumab for under K-RAS Group and the use of Bevacizumab for N-RAS, the use of Erbitux it has in fact greatly reduced.

EXTREMOPHILES FROM COLD AND HOT ENVIRONMENTS RESISTANT TO ULTRAVIOLET RADIATION (UV-C) SIMULATING SPACE ENVIRONMENT

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Bacterial spores are ubiquitous in the environment, they are able to survive to chemicals and physical insults including ultraviolet radiations (UV). The exposure to UV-C (=254nm) is an efficient germicidal treatment, and it is also used to simulate space-environment effects, like those on Mars. Extremophiles exhibit an extraordinary tolerance to physical and chemical extremes, therefore they are expected to possess novel unexplored applicative potentials. To search for novel radiation-resistant extremophiles, in this work we evaluated the resistance to UV-C of spores from bacilli isolated from cold and hot environments. The studied strains were: i) psychrotolerant *Bacillus* sp. strains: A30, A34, A43, A45, B51 and B58, isolated from Antarctic permafrost (Edmonson Point); ii) thermophilic strains: *G. vulcanii* DSM 13174 (Gv), *B. horneckiae* SP (SP), *B. licheniformis* T14 (T14), and *Bacillus* sp. P82 isolated from shallow hydrothermal vents of Eolian Islands (Italy). To determine the UV-C resistance, aliquots of spore suspensions for each strain were irradiated at the following doses 0, 100, 125, 200, 250, 400, 500, 800 and 1000 J/m^2. Viability of the spores was expressed as the lethal dose of radiation necessary to kill 90% of spores (LD_{90}). The LD_{90} values of spores were T14≥A34>SP>A43>A45>P82>B58>B51>Gv>A30. The spores from the thermophilic Eolian strain T14 were the most resistant (LD_{90}=127 J/m^2), followed by spores of the Antarctic *Bacillus* sp. A34, which were the most UV-C resistant (LD_{90} values of 126.7 J/m^2) among psychrophilic strains. These spores could have a relevant impact to reduce the risk of contamination in human activities and in Astrobiology, as novel bacterial multi-resistant models in the space exploration missions.

COMPARISON OF MUSSEL PRODUCTION PARAMETERS FROM TRADITIONAL AND IMTA SITES IN THE ADRIATIC SEA (CROATIA)

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The Adriatic Sea is generally too oligotrophic to support

the aquaculture of bivalves in the open sea. Therefore, most of the production is settled in areas close to freshwater inputs, such as river estuaries, lagoons and other more eutrophic sites. Numerous studies have demonstrated the benefits and potentials to increase economical, ecological and social accessibility of Integrated Multitrophic Aquaculture (IMTA), but little is known on its potential in this region. The aim of this research is compare growth rates, condition index and other quality parameters of IMTA produced mussels in the Adriatic sea with those produced at sites traditional for bivalve farming in the Adriatic Sea. The experiment was based on project INOVaDa – Investigation of quality and promotion of mussels from the Novigrad Sea, funded through European social fund. It was set up in September 2015 at four sites: a seabass/seabream farm located in the Central Adriatic (IMTA site), Starigrad (open sea site), Novigrad Sea (traditional site at estuary) and Krka estuary and periodically the mussels were analyzed following a protocol. The preliminary results indicate that all sites have enough food availability to support the growth of bivalves. However, the results promote traditional site close to the river estuaries (such as Novigrad Sea) as more suitable in terms of meat yield, and additionally show the IMTA sites in the oligotrophic environment like a good alternative for an increase of mussels aquaculture. The study will continue throughout the year to improve and to increase the results.

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