



Sara Cannavò

ABOUT ME

Ongoing research grant at University of Roma La Sapienza (MEDS-02/A)

Doctoral degree in Biotechnology at University of Perugia (AGR/07)

Master's degree at University of Cologne (Germany) (LM6 legalized, not equivalent)

Bachelor's degree at University of Perugia (L13)

As a highly-motivated student within the field of Biological Science, I achieved a proven track record of my academic career.

These placements have enabled me to develop critical thinking and excellent written and oral presentation skills, and to widen my research interests and contacts. I developed and maintained successful working relationships, and I acquired valuable knowledge on traditional and next generation approaches and tools. I look forward to improving my skill set further, and continue to bring strategic value to the field of Life Sciences, as well as apply achieved know-how to other fields.

WORK EXPERIENCE

Grant holder

Prof. Gianna Romeo [01/10/2024 – Current]

City: Latina | Country: Italy

Cutaneous Squamous Cell Carcinoma (cSCC) and its precursors, actinic keratosis and Bowen's disease, are the most common types of keratinocytic skin lesions (KSLs) which account for the majority of non-melanoma skin cancer lethality. Currently, clinical and histopathological criteria are used for the diagnosis, classification and therapeutic intervention of KSLs. However, discrepancies exist between the clinical presentations and histologic analyses of these lesions, making the diagnosis difficult. The identification of biomarkers as companion diagnostics for accurately stratifying KSL types is required to support the paradigm shift in current cancer care to personalized, precision medicine and ameliorate the negative impact of misdiagnoses or delayed diagnoses on patient outcome. Also, it is essential to elaborate on the poorly defined molecular modifications required for the initiation, development and progression of KSLs from normal keratinocytes. The development of non-invasive tools such as liquid biopsy based on molecular analysis of blood samples will complement existing clinical and histopathological parameters, leading to an improvement in patient outcomes.

Here we aim at exploiting extracellular vesicles (EVs) to verify the hypothesis that circulating EVs could transport and transmit specific messenger RNAs (mRNAs) to recipient cells useful as predictive markers of progression from normal to proliferative lesions as well as from low risk, non-metastasizing forms to high risk, highly invasive carcinomas. We also test the hypothesis that the overexpression of these mRNAs could be due to microRNAs (miRNAs) dysregulation. Finally, we correlate mRNAs/miRNAs expression with anti-PD1 antibody therapy and patient outcome, proposing them as therapeutic markers.

Ph. D. student

Employer Prof. Stefania Pasqualini [30/10/2020 – 10/06/2024]

City: Perugia | Country: Italy

Research activity:

Azolla spp. are perennial, monoecious floating freshwater ferns that live in a permanent mutualistic symbiosis with the nitrogen-fixing cyanobacterium *Trichormus azollae* and other species-specific endophytic prokaryotic strains. Collectively, they form a superorganism. The benefits of *Azolla* as a biofertilizer for rice are well-documented, but only those relative to its capability of providing nitrogen. In fact, traits that might provide growth-promoting substances (i.e., phytohormones, volatiles) remain mostly unexplored. Furthermore, this fern accumulates 3-deoxycyanidins and other flavonoids such as proanthocyanidins. However, *Azolla* has a high phenotypic plasticity, which suggests that the pathways for flavonoid biosynthesis are highly complex in this genus. The recent availability of the *Azolla filiculoides* genome allows for genomic analysis of complex pathways.

Our work aimed at investigating *A. filiculoides* as a trigger of morphogenic changes in rice, assessing rice growth, development and yields, and looking at the molecular mechanisms that govern interactions between the fern, its main associated cyanobacterium, and rice. Furthermore, the goal was to characterize volatile emission profiles of *A. filiculoides* at increasing light intensity and discriminate the relative contribution of *T. azollae*. In addition, we intended to determine the environmental and genetic factors controlling the biosynthesis and accumulation of secondary metabolites with an extensive range of applications (i.e., flavonoids).

To achieve our goals, we used a multi-disciplinary and application-oriented approach, morphological and targeted and untargeted molecular analyses.

Tutoring activity:

I had the chance to assist several Bachelor's and Master's students in their thesis work

Teaching activity:

I had the opportunity to hold theoretical and practical lectures to students enrolled in their Bachelor's degree

Trainee (as part of the Bachelor's Degree)

AENOVA Group [22/08/2014 – 29/09/2014]

City: Borgo San Michele, Latina (LT) | Country: Italy

- Specimens collection
- Bacteria isolation and counting
- Gram staining and Bacterial identification through Catalase, Oxidase and Coagulase tests
- Limulus Amebocyte Lysate (LAL) test to assess the presence of endotoxins in water
- Drugs quality check

EDUCATION AND TRAINING

Erasmus+ Mobility for traineeship (as part of the doctoral degree)

Institute of Experimental Botany of the Czech Academy of Sciences [15/06/2022 – 15/09/2022]

City: Prague | Country: Czechia

- Targeted-hormonomics by IS and LCMS-QQQ on hundreds samples from rice organs, *Azolla*, *T. azollae* axenic cultures and liquid media after appropriate extraction and processing.

Master's degree in Biology

Universität zu Köln [30/03/2018 – 05/05/2020]

Address: Biozentrum, Zùlpicher Str., 47b, 50674 Köln (Germany)

- Restoration projects, agricultural fields management, and soil health, fertility and functioning
- Cell death and inflammation (CRISPR-Cas9 and FACS)
- Cyanobacterial blooms, toxicity in freshwaters and *Daphnia* fitness: cyanobacterial protease inhibitors extraction, isolation and identification via HPLC. Spectrophotometric detection of %inhibition activity of the extracted inhibitors on *Daphnia*'s homogenized

- Master's thesis, PUFAs on *Daphnia* fitness: preparation of various liposomes and GC analysis with FID of FAs content, standardized growth experiments with several *Daphnia*'s genotypes (Lake Bysjön, Sweden) at 15 (cold adaptation occurs) and 20 °C and prediction of competition between genotypes by constructing Norm of Reaction (NoR) graphs

FCE Cambridge English Language Assessment

British Council [29/09/2017 – 29/10/2017]

City: Rome | Country: Italy

Erasmus+ Mobility for Traineeship (post-lauream)

Universität Bielefeld, Department of Cell Biology [29/11/2016 – 28/09/2017]

City: Bielefeld | Country: Germany

- Learning about projects and lab-work to help people out with experiments and their preparation
- Conduct independent research
- Report achievements weekly
- Participate to meetings, conferences and seminars organized by the department
- Present papers

Bachelor's degree in Biology

University of Perugia [28/09/2012 – 13/10/2016]

City: Perugia | Country: Italy

Summer School Course Diploma

St. Giles International School [29/06/2015 – 29/08/2015]

City: London | Country: United Kingdom

High-school Diploma

Scientific high-school "G.B. Grassi" [30/08/2007 – 30/08/2012]

City: Latina | Country: Italy

School Course Diploma

Brighton International Summer School [13/12/2009 – 13/01/2010]

City: Brighton | Country: United Kingdom

PADI Certificate (EUF)

Ventotene Diving Academy [18/06/2009 – 18/07/2009]

City: Ventotene | Country: Italy

ECDL

IC Frezzotti-Corradini [30/08/2006 – 30/08/2008]

City: Latina | Country: Italy

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s): English | German

DIGITAL SKILLS

R/ R Studio / Microsoft Office / Bioinformatic tools for primers design / Bioinformatic tools for high-throughput data analysis / Bioinformatics software such as MEGA / Bioinformatic database / Sharing platforms and job coordination / Bioimagingology

PUBLICATIONS

- [2023]
Impact of High Light Intensity and Low Temperature on the Growth and Phenylpropanoid Profile of *Azolla filiculoides*
- [2022]
Exposure to different light intensities affects emission of volatiles and accumulations of both pigments and phenolics in *Azolla filiculoides*
- [2021]
Light and temperature shape the phenylpropanoid profile of *Azolla filiculoides* fronds

CONFERENCES AND SEMINARS

- [22/06/2023 – 23/06/2023] Ghent, VIB - TRIC23
The fern *Azolla filiculoides* shapes rice root architecture: phytohormone and transcriptomic analyses to uncover info-chemicals signals between the partners
- [23/01/2023 – 30/01/2023] Perugia, Winter School of Biotechnology of Perugia
The fern *Azolla filiculoides* shapes rice growth: phytohormone and transcriptomic analyses to uncover info-chemicals signals between the partners
- [10/09/2022] Bologna
Disentangling the interaction between rice and *Azolla filiculoides* Riunione Annuale dei Gruppi di Lavoro della Societa' Botanica Italiana (SBI)
- [16/01/2022 – 20/01/2022] ONLINE, Winter School of Biotechnology of Perugia
Rice productivity: what's beyond *Azolla* as biofertilizer?
- [16/01/2022 – 20/01/2022] ONLINE, Winter School of Biotechnology of Perugia - Brainstorming
How *A. filiculoides*-derived Indole-3-Acetic Acid (IAA) may affect rice root architecture?
- [14/06/2021 – 16/06/2021] ONLINE, Riunione Annuale dei Gruppi di Lavoro della Societa' Botanica Italiana (SBI)
The co-cultivation of *Azolla filiculoides* and *Oryza sativa* shape the phenotype of rice plants
- [16/01/2021 – 20/01/2021] ONLINE, Winter School of Biotechnology of Perugia
Light and temperature shape the transcriptional and metabolic profiles of phenylpropanoids in *Azolla filiculoides*

DRIVING LICENCE

- Driving Licence: A
- Driving Licence: B