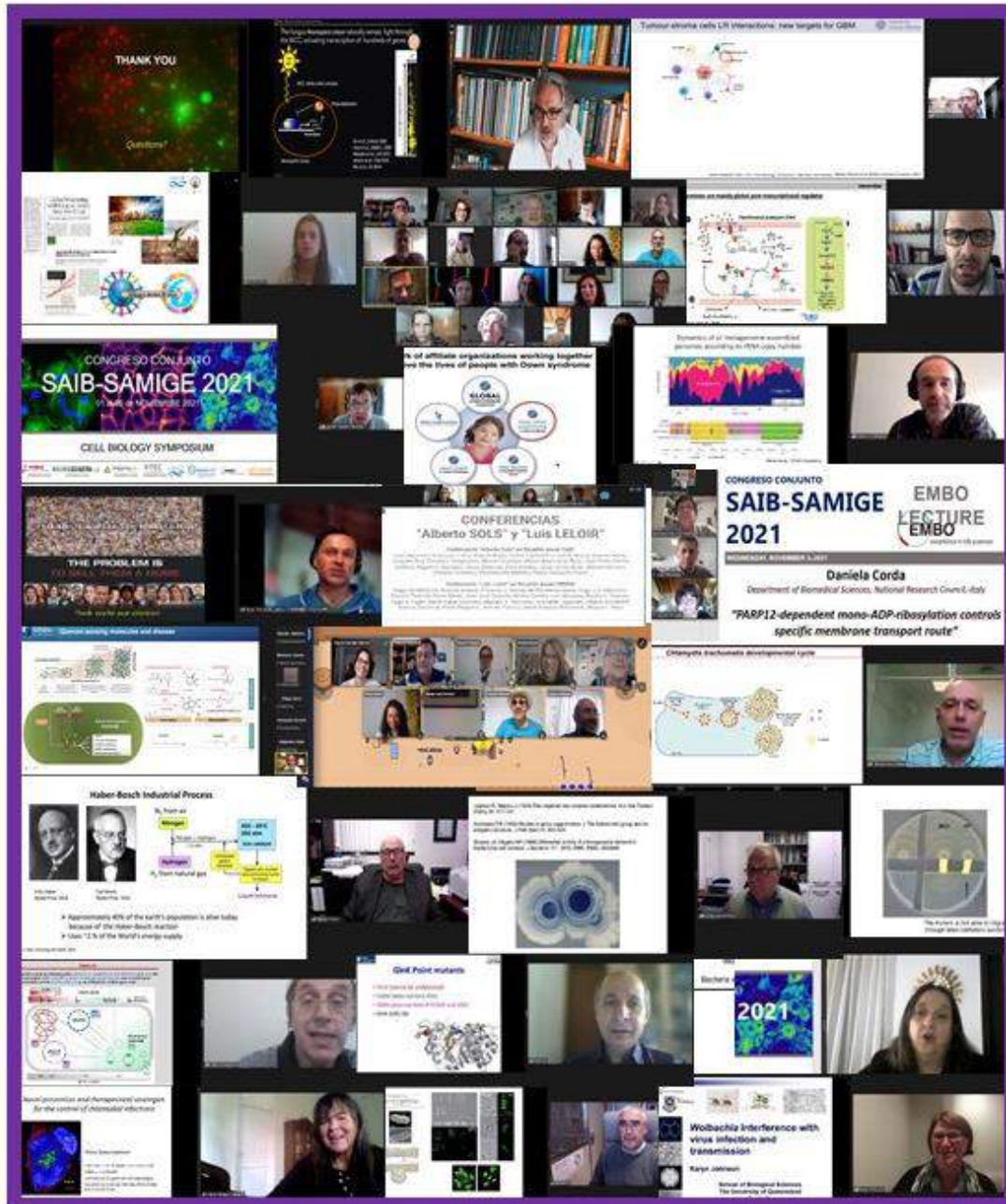


SAIB - SAMIGE Joint meeting 2021 on line



November 1-5, 2021



***LVII Annual Meeting of the
Argentine Society for Biochemistry
and Molecular Biology Research
(SAIB)***

***XVI Annual Meeting of the
Argentinean Society for
General Microbiology (SAMIGE)***

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the hypocotyl compared to control plants. Under UV-B exposure, increased hypocotyl elongation of transgenic lines was observed only in +N condition. Further investigation is necessary to understand the UV-B acclimation response of transgenic SyNOS lines. Acclimation to a state of stress combination has been shown to involve integrating responses to each of the individual stresses that simultaneously impact the plant (e.g., low N or UV-B stress), as well as the induction of a new type of response, sometimes involving thousands of transcripts, that is unique to the state of stress combination. In summary our results are encouraging towards obtaining crops with better yield under combined stressful conditions.

BT-P13-188

CELL FREE BIOSENSORS FOR DETECTION OF CONTAMINANTS IN WATERS OF THE MATANZA RIACHUELO BASIN

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Water quality assessment is an issue of global relevance. Locally, 15% of Argentina's population inhabits the Matanza-Riachuelo Basin, whose natural and superficial waters have been found not to be apt for human use or consumption due to the presence of natural (ie. arsenic) or anthropogenic (ie. transition metals) pollutants. Monitoring the presence of these contaminants along the basin by local authorities is limited due to the need of specific, expensive, and non-transportable equipment. Recent advances in cell-free synthetic biology have spurred the development of *in vitro* molecular diagnostics. Here, we present the work done in fine-tuning two cell-free biosensors. Both systems can be freeze dried for easy storage and distribution making them a perfect choice as inexpensive point of use water quality assessment devices. First, we report the advances done on a cell-free *in vitro* transcription platform, aptly named ROSALIND. This is a modular system that combines a highly processive RNA polymerase, allosteric transcription factors and synthetic DNA transcription templates to regulate the synthesis of a fluorescence-activating RNA aptamer in presence of a target contaminant. The platform has been validated to detect a range of water contaminants. Here we focus on our recent work of tuning the reaction to detect relevant pollutants in the basin in collaboration with the local authority ACUMAR. More recently, we are working to incorporate a new generation of biosensors based on cell-free protein expression on bacterial lysates that will allow us to widen the range of contaminants we can detect to other common ones such as arsenic and nitrates. Cell lysates-based biosensors allow us to forgo the need to add purified components, decreasing the price and labor cost of individual reactions. The signal can be easily amplified thus allowing for low detection limits. Here we present the first steps on preparing the cell extracts and validating their quality for later use in sensors.

BT-P14-203

EXTREMOPHILE CYANOBACTERIA: *IN VITRO* PRODUCTION OF PROTECTIVE COMPOUNDS AGAINST UVB RADIATION

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The Andean Altiplano-Puna is a sedimentary volcanic plateau at an average altitude of 4000 m located between latitudes 13° and 27° south. Solar irradiance is 165% higher than that at the level of the sea with instant flow of UV-B that reaches 17 Wm², low nutrient concentration particularly phosphorous; presence of heavy metals and arsenic and broad fluctuation of the temperature of the air, ranging from 20 °C during the day to -10 °C at night. Even though these conditions are highly limiting, previous results from our laboratory have described the microbial diversity of different lakes, mats and crust of the altiplano and revealed an unexpectedly diverse microbial community, including several genera of cyanobacteria. Cyanobacteria isolated from extreme conditions like Andean microbial mats and crust could produce mycosporine-like amino acids (MAAs) as a mitigation strategy to reduce the damaging effect of ultraviolet radiation. In order to probe the production of MAAs from these cyanobacteria, the analysis of the methanolic extract by spectrophotometry was used as a rapid method to know the presence or absence of these compounds. Different strains of cyanobacteria were placed in quartz tubes and exposed to UVB radiation for 4 and 24 hours. Then the culture was centrifuged at 10000 rpm during 10 min, and 0,15 g of biomass were placed in tubes with 15 ml of methanol during 24 h in dark. Methanolic extract was analyzed in a spectrophotometer by scanning from 250 nm to 750 nm. Also, the methanolic extract was analyzed with high performance liquid chromatographic (HPLC), using Waters Alliance 2695e - Waters PDA 2998 Detector - Empower 2 Software, Column: Gemini C18-5u-4.6 x 250 mm and the mobile phase: 0.1% acetic acid in methanol 2.5%. The cyanobacteria that showed presence of MAAs were cultivated in different conditions in order to determine the most convenient: condition 1: light 24 h, without shaking and room temperature; condition 2: light:dark 12:12 h, without shaking and 28°C; condition 3: light:dark 12:12 h, without shaking but bubbling air into the reactor and 28° C. The strain GTAR 001, *Anabaena sp.*, showed the most significant peak of absorbance at 334 nm when was exposed for 24 h to UVB. The MAAs reported for cyanobacteria have peaks between 310 and 360 nm and the peak of 334 nm corresponds to Shinorine. On the other hand, the strain GTAR 001 produced significantly more biomass with condition 3 and in a shorter period. These preliminary results agree with the MAAs reported for *Anabaena sp.* isolated from rice paddy field and hyper saline pond/marine habitat. It will be necessary to analyze this compound with liquid chromatography coupled with tandem mass spectrometry for the final determination.