Sociedad Argentina de Microbiología General

XIX CONGRESO DE LA SOCIEDAD ARGENTINA DE MICROBIOLOGÍA GENERAL

22 al 25 de octubre del 2024
Centro cultural y Pabellón Argentina de la Universidad Nacional de Córdoba, Córdoba, ARGENTINA.

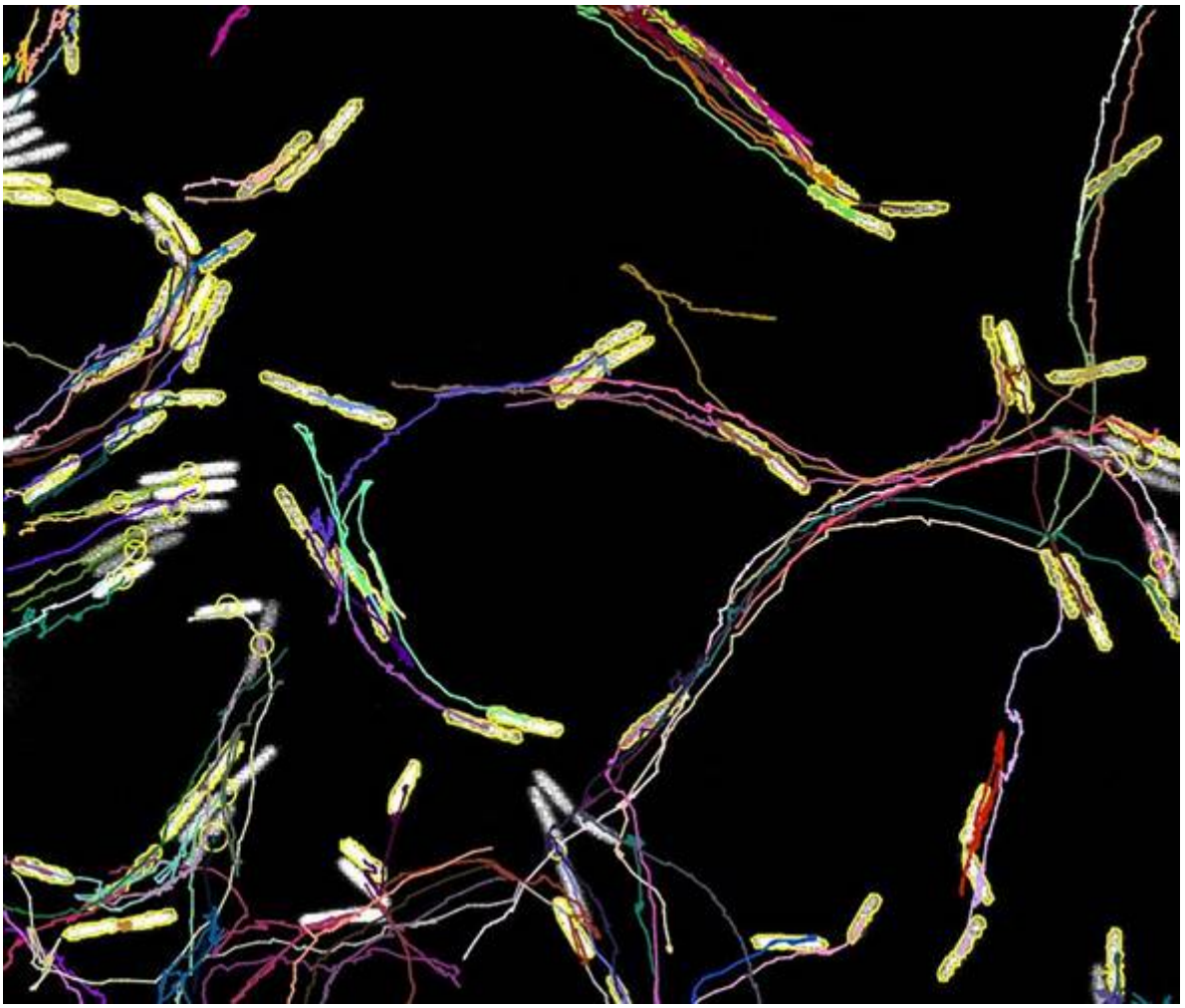

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

235 - invitados

IMPLEMENTATION OF SYNTHETIC BIOLOGY PRINCIPLES TO BUILD ADVANCED GENETIC SYSTEMS WITH BIOTECHNOLOGICAL APPLICATION: OPTIMIZED RECOMBINANT PROTEIN PRODUCTION AND CRISPR-BIOSENSING

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As a new field of study, synthetic biology has already contributed to significant advances in industry, energy, agriculture, and health. Still in its early days, synthetic biology consolidated itself as a separate discipline from molecular biology, focusing on engineering new biological functions incorporating computer science and electrical engineering concepts and principles. The construction of synthetic genetic circuits with complex functionalities fueled progress in this new area. More recently, the revolution brought about by CRISPR technology in genetic engineering has helped establish several alternative molecular tests with potential applications, for example, at the point-of-care for a patient or in industrial quality control. Our studies are based on the idea that it is possible to apply synthetic biology principles to the idealization and optimization of genetic tools that are already commonly used for biotechnological purposes, including recombinant protein expression systems and genetic biosensor devices. First, a genetic circuit was constructed to aid the expression of soluble recombinant proteins through controlled intracellular processing (CIP). This system yielded a high concentration of soluble recombinant proteins (272.0 ± 60.1 ?g/mL culture), and the percentage of recombinant protein without the solubilization tag was up to 67.3%. The application of this system will facilitate the production of proteins that are difficult to express and of biotechnological interest, such as the Bst-LF polymerase, which has application in biosensor systems. The objective is to integrate this enzyme into a diagnostic tool also developed in the context of this study, based on CRISPR technology, which has already been adapted to detect the genomic RNAs of the SARS-CoV-2 and ZIKV viruses. The test had an analytical sensitivity of 50 viral copies/?L and showed high accuracy in patient samples (area under the ROC curve = 1.0; CI: 0.715 - 1.00), using detection by a cellphone application with computer vision integrated. The conception of both technologies demonstrates the potential of synthetic biology for the development of new biotechnological products.

Palabras clave: palabras_clave