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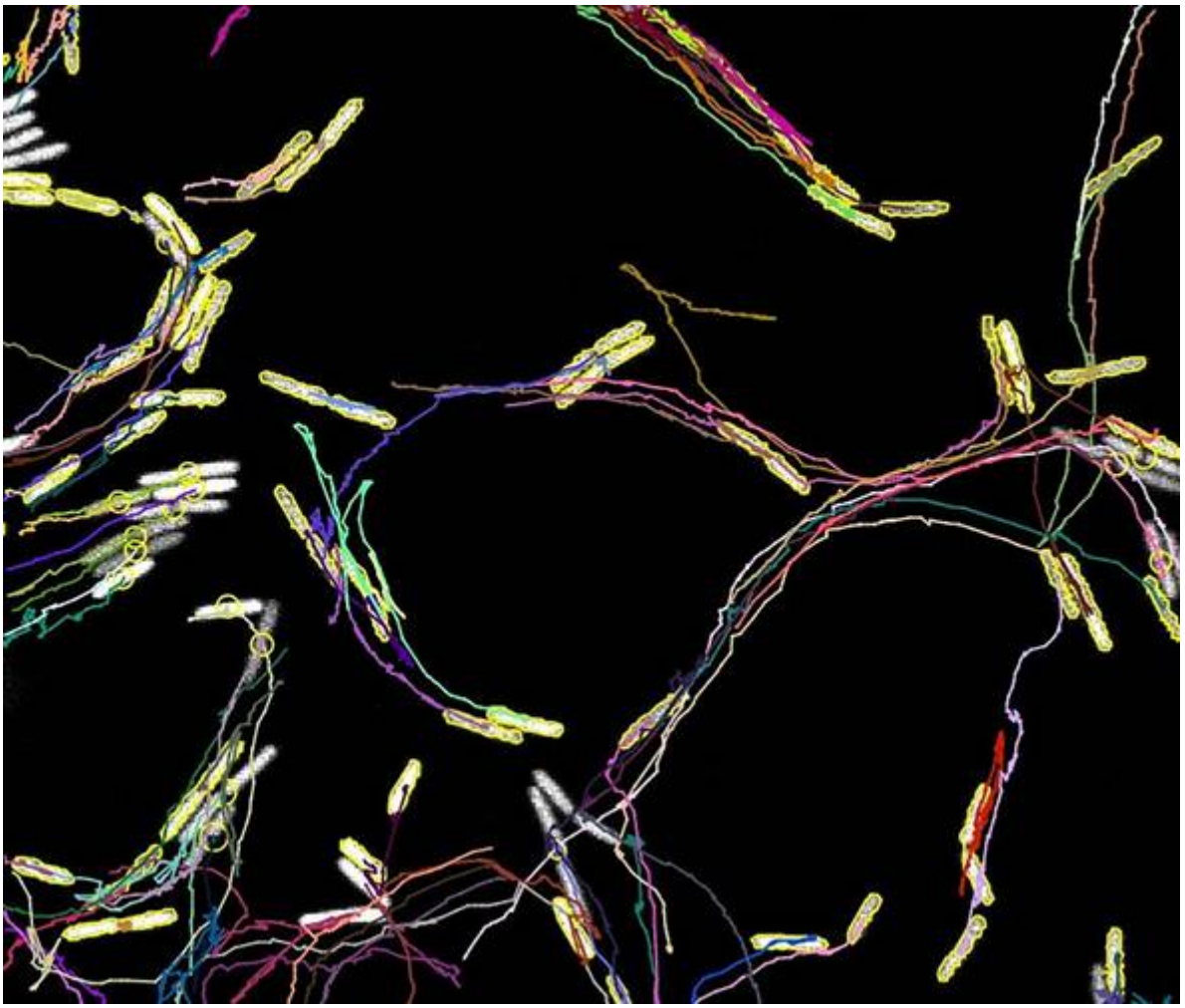

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

71 - Biodegradación, Biorremediación y Biodeterioro

NEW ENVIROMENTAL- *Pseudomonas*-BASED TECHNOLOGIES FOR THE BIOREMEDIATION AND BIODETECTION OF HEAVY METALS

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Mercury (Hg), lead (Pb) and cadmium (Cd) are among the most toxic metals for humans and the environment. These metals, present in agro-industrial, mining, and populated regions common wastes can reach groundwater, rivers and streams if they are not correctly disposed. Therefore, it is important to develop new biotechnologies to eliminate these contaminants. In our laboratory, we have isolated environmental *Pseudomonas* strains from groundwater. One of these isolates, *P. sagittaria* MOB-181, showed high capacities to form biofilms and oxidize and remove Mn(II) from groundwater. To further investigate whether MOB-181 could be useful for heavy metal bioremediation, we studied its tolerance to Hg, Pb and Cd. Growth curves in the presence of different Hg(II), Cd(II) or Pb(II) concentrations were performed. We determined that MOB-181 tolerates up to 90 ?M of Hg(II), 50 ?M of Pb(II) or 40 ?M of Cd(II). The same experiments were conducted with *P. putida*, a bacteria widely used in bioremediation processes, which tolerates up to 10?M of Hg (II) or Cd(II) and 30 ?M of Pb(II). These results show that MOB-181 has a higher resistance to these metals and particularly for Hg(II) compared with *P. putida*. Then, we analyzed MOB-181's biofilms performance in the removal of heavy metals from soluble samples. For this, we used a previously designed simple test based on the synthetic whole-cell *E. coli* biosensor, GolS77/PgolB-gfp, to quantify the amount of remanent metals in treated samples by coupling Hg(II), Cd(II) or Pb(II) detection to the emission of green fluorescence. MOB-181 biofilms were grown in LB and exposed to 10 ?M Hg(II), Cd(II) or Pb(II), the remaining metals in the suspensions were quantified through the time with the biosensor test. The biofilms of MOB-181 removed more than 97% of added Hg(II) after only 4 hours of incubation, but were less efficient in removing Cd(II) and Pb(II) . The concentration of these metals decreased 46% and 12%, respectively, after 48 incubation hours. In view of these results, we analyzed the MOB-181 genome and identified two loci of Hg resistance genes that included the genes coding for the specific transporters (MerE, MerF and MerT), the reductase MerA, and the MerR and MerD regulators. Also, we observed the presence of putative Cd(II) and Pb(II) tolerance genes randomly scattered in the genome and coding for non-specific divalent metal efflux systems.

Palabras clave: Key words: Bioremediation – Heavy metals – Biofilms – Bio-detection