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BIOTECNOLOGIE PER LA GESTIONE AMBIENTALE E L'AGRICOLTURA SOSTENIBILE (BIOEMSA)

LUNEDI' 8 LUGLIO 2019, ore 15.00
AULA W1
Via Maragliano 77, Firenze

la Prof **EonSeon Jin**, Department of Life Science, Hanyang University, Seoul, Korea

terrà un seminario dal titolo

Carbon capture and utilization implemented by metabolic engineering approach of microalgae

Abstract

The development and implementation of strategies for CO_2 mitigation technology is necessary to offset the greenhouse gas effect of carbon dioxide emissions. There is the possibility of the capture and utilization of CO_2 (CCU) in which waste CO_2 is recycled and converted into value added chemicals. Microalgae are responsible for half of the global primary productivity, converting solar energy to organic energy and fixing carbon dioxide, making them important for the mitigation of greenhouse gases. There are numerous commercial applications of microalgae in areas including nutrition, pharmaceuticals, and biofuels. Over production of specific high value biochemical requires the modification of metabolic pathway. However, metabolic engineering in microalgae has been limited, specific transformation tools are required to develop for each microalgal species. Recently, resulting in effort for developing tools for the precise nuclear gene editing of microalgae, employment of metabolic engineering of microalgae has been attempted. Hence, in this study, one-step transformation of microalgae by the DNA-free CRISPR-Cas9 method instead of using plasmids

that encode Cas9 and guide RNAs was carried out to generate a commercially desirable microalgal strain for mass cultivation. This strain can produce high value pigment without any induction process and its truncated antenna property can confer greater productivity of mass culture under bright sunlight. The resulting CRISPR-RNP derived algae could be exempt from genetically modified organism (GMO) regulations due to the absence of foreign DNA sequences. This technology will applied to various areas of algal research including algal biotechnology.

Keywords: CO2 capture and utilization, Microalgae, targeted genome editing, DNA-free CRISPR-Cas9