BIV funding lights up collaboration on fluorescent protein expression in microalgae

A business interaction voucher from BioProNET has enabled Anil Day from the University of Manchester to partner with biotech company Protein Technologies. Their project focused on the the expression of a novel fluorescent protein — which could have applications in optical imaging studies in laboratory animals — in microalgae.

The production of recombinant proteins in microalgae could offer a lower-cost alternative to mammalian or bacterial systems. The first step to showing that protein production in microalgae is commercially viable is demonstrating that the desired protein can be expressed in microalgae.

The collaboration provided Protein Technologies, which focuses on protein engineering and the manufacture of recombinant proteins, with access to state of the art expertise to express recombinant proteins in microalgae and plants. "This is an area of considerable interest to Protein Technologies but we were unable to do it in-house due to the expertise and resources required," says Farid Khan of Protein Technologies.

After first generating vectors containing the gene encoding for the infrared protein, the vectors were then transformed into the chloroplasts of the microalgae *Chlamydomonas reinhardtii.* Western blot analysis on total protein from this transgenic strain showed accumulation, albeit limited, of the infrared protein.

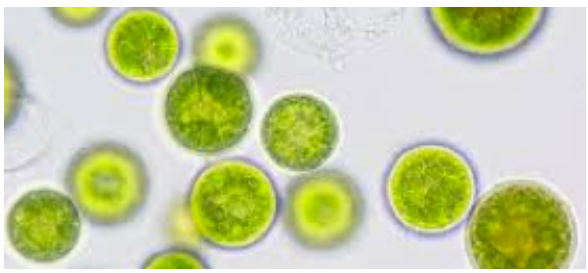
"This first set of transgenic strains of microalgae provides a valuable resource for improving yields by media formulation and changing environmental parameters such as temperature, light intensity and day length," says Anil.

The project also refined methods for detecting the accumulation of the infrared protein in transgenic algae.

Because much higher levels of recombinant protein expression can be obtained in the chloroplasts of plants, genes encoding the infrared protein were then cloned into a vector to allow expression of the protein in tobacco plants. Anil explains that this additional step is ongoing because it takes longer (typically 4-6 months) to isolate stable transgenic plants.

The project has allowed Anil a new insight into his field, "We worked on a commercial protein that had a clear route to market. We would not have considered outside this collaboration," he says.

As a result of this project a proposal led by Protein Technologies including the University of Manchester on the industrial biotechnology applications of microalgae has been submitted to the Newton Fund.



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