Novel Library of Native Algae Species with Beneficial Health Effects

Isolation of biologically active compounds that potentially have potential antioxidant, anticancer, antimicrobial, antiviral, and anti-inflammatory effects

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Field

- Medical

Technology

Culture collection of over 100 photosynthetic microorganisms

Benefits / Features

- Novel strains of microorganisms with biologically active compounds
- Selected strains could be efficiently cultivated in a controlled process
- Could reduce cost of medical therapy due to synergistic enhancement

Potential Commercial Applications

- Medical / healthcare applications
- Source of fluorescent pigments

Stage of Development

Proof of concept, novel strains isolated, screening in process

Status

Seeking development & licensing partners

Background

Microalgae are microscopic photosynthetic organisms capable of a rapid multiplication under simple environmental conditions. Not only do microalgae produce approximately half of the atmospheric oxygen and use simultaneously the greenhouse gas carbon dioxide to grow photoautotrophically, they represent an almost untapped resource due to their biodiversity. It has been estimated that about 200,000-800,000 species exist of which about 35,000 species are described. In addition, over 15,000 novel compounds originating from algal biomass have been chemically determined and most of these microalgae species produce unique products like carotenoids, antioxidants, fatty acids, enzymes, polymers, peptides, toxins, and sterols.

Worldwide, cyanobacteria have been part of the human diet for centuries. Today, microalgae and cyanobacteria are either produced in controlled cultivation processes or harvested from the natural habitats and marketed as food supplements around the world. Similar to microalgae, cyanobacteria produce a vast array of different biologically active compounds that potentially have antioxidant, anticancer, antimicrobial, antiviral, anti-inflammatory, and other effects.

Description of Technology

Florida International University has identified and maintains a unique culture collection of cyanobacteria and microalgae that were isolated from Florida freshwater habitats such as the Florida Everglades, Florida lakes, as well as from marine environments. The collection contains more than one hundred strains and is being regularly expanded with addition of new isolates. The extracts of these strains are being tested and screened for the presence of biologically active compounds such as antimicrobial, mosquito antilarval, and anticancer compounds. Initial screening revealed that relatively high number of these strains had some of the tested biological activity. In addition, the research interest of FIU includes the screening for algal strains with high lipid content as a potential source for biofuels, use of cyanobacteria as a source of fluorescent pigments, and use of cyanobacteria as a synergistic enhancer of existing anticancer drugs.

For example, one of the proprietary microalgae species in the culture collection is a cyanobacterium that produces phycocyanin. The researchers have demonstrated that phycocyanin can be used as a synergistic enhancer of existing anticancer drugs. Results from laboratory studies indicate that phycocyanin used concurrently with an existing anticancer drug, significantly lowered the survival of cancer cells. This could potentially enable the use of lower doses of the currently available drugs that are notorious for their harsh side effects.

Opportunity

Further isolation, development, and commercialization of selected promising cultures in the Florida International University collection of over 100 different photosynthetic microorganisms (cyanobacteria and algae) that were isolated from various freshwater habitats in Florida.