

Seaweed extract found to have promising effects in brain cancer treatment

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Sugar kelp (*Saccharina latissima*) cultivated by GENIALG partner, Seaweed Energy Solutions (SES). Credit: SES

A compound found in brown seaweeds could help to treat one of the most common and aggressive forms of malignant brain tumor.

The compound's promising effects were discovered by researchers in the EU-funded project GENIALG (GENetic diversity exploitation for Innovative macro-ALGal biorefinery). The fucoxanthin compound is a

type of carotenoid pigment found in brown seaweeds, such as *Saccharina latissima*. Also known as sugar kelp, the [seaweed](#) is cultivated in Europe and is available commercially. Fucoxanthin is a [bioactive compound](#) previously found to have numerous health benefits including antioxidant, anticancer and anti-obesity effects.

GENIALG project partners IOTA Pharmaceuticals, a UK-based oncology SME, and the University of York (UK) collaborated with the University of Cambridge (UK) to further our knowledge of fucoxanthin in this multi-million euro project.

Dr. David Bailey, director of IOTA Pharmaceuticals explained, "We found that fucoxanthin not only inhibits cancer cell growth by itself, but also improves the effectiveness of certain (antiproliferative) [pharmaceutical drugs](#). This means that treatment of human brain cancer cells with a combination of pharmaceutical drugs and a natural product extracted from seaweed could provide a new, more effective treatment option in targeting this challenging disease in certain contexts."

The compound could provide an effective treatment against glioblastoma multiforme (GBM), the most common and aggressive form of malignant brain tumor, with an annual incidence of three to four cases per 100,000 people in Europe. Even though knowledge of its genetic causes is improving, it remains an incurable disease, with patients having an average survival rate of 12 months after diagnosis. Part of the poor prognosis is due to tumor heterogeneity: different parts of the tumor have different characteristics, so tend to respond differently to treatment. As a result, a single treatment may kill some of the cancerous cells, while others continue to grow. Therefore, it is important to find and develop combination therapies that can tackle all parts of the tumor.

IOTA Pharmaceuticals specializes in GBM drug discovery, using novel tools and technologies to address this challenging disease. Within the

GENIALG project, IOTA Pharmaceuticals are studying the possible pharmaceutical application of natural products from brown seaweed as anticancer agents. Recent results have now been published in *PLOS ONE*.

Dr. Bailey further explained, "We have observed that not all pharmaceutical drug and natural product combinations are synergistic, possibly due to cell-specific mechanisms. This observation supports the idea that specific drug and natural product combinations might be more effective in certain disease contexts. Interestingly, we have also observed that fucoxanthin appears much more effective as an anticancer agent than other carotenoids, suggesting that there are structural features of fucoxanthin beyond its carotenoid nature that are important for its therapeutic effects. Exactly what these are remains to be determined."

Brown seaweed is one of the [target species](#) in GENIALG, an industry-driven project focusing on seaweed, or "macroalgae," as a valuable source of diverse bioactive compounds that have great potential to be used in pharmaceuticals, nutraceuticals and functional foods. Pioneering companies in large-scale integrated European biorefineries and experts in seaweed cultivation, genetics and metabolomics are working closely together to boost the seaweed industry in Europe.

More information: Lavinia-Lorena Pruteanu et al. Transcriptomics predicts compound synergy in drug and natural product treated glioblastoma cells, *PLOS ONE* (2020). [DOI: 10.1371/journal.pone.0239551](#)

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