

The Genome of the Marine Alga *Ulva compressa* (Chlorophyta) Reveals Protein-Coding Genes with Similarity to Plants and Green Microalgae, but Also to Animal, Bacterial, and Fungal Genes

- Osorio, Héctor^a[Send mail to Osorio H.](#);
- Tapia-Reyes, Patricio^b[Send mail to Tapia-Reyes P.](#);
- Espinoza, Daniela^a[Send mail to Espinoza D.](#);
- Laporte, Daniel^c[Send mail to Laporte D.](#);
- González, Alberto^a[Send mail to González A.](#);
- Castro-Nallar, Eduardo^{d, e}[Send mail to Castro-Nallar E.](#);
- Moenne, Alejandra

Abstract

The genome of the marine alga *Ulva compressa* was assembled using long and short reads. The genome assembly was 80.8 Mb in size and encoded 19,207 protein-coding genes. Several genes encoding antioxidant enzymes and a few genes encoding enzymes that synthesize ascorbate and glutathione were identified, showing similarity to plant and bacterial enzymes. Additionally, several genes encoding signal transduction protein kinases, such as MAPKs, CDPKs, CBLPKs, and CaMKs, were also detected, showing similarity to plants, green microalgae, and bacterial proteins. Regulatory transcription factors, such as ethylene- and ABA-responsive factors, MYB, WRKY, and HSTF, were also present and showed similarity to plant and green microalgae transcription factors. Genes encoding enzymes that synthesize ACC and ABA-aldehyde were also identified, but oxidases that synthesize ethylene and ABA, as well as enzymes that synthesize other plant hormones, were absent. Interestingly, genes involved in plant cell wall synthesis and proteins related to animal extracellular matrix were also detected. Genes encoding cyclins and CDKs were also found, and CDKs showed similarity to animal and fungal CDKs. Few genes encoding voltage-dependent calcium channels and ionotropic glutamate receptors were identified as showing similarity to animal channels. Genes encoding Transient Receptor Potential (TRP) channels were not identified, even though TRPs have been experimentally detected, indicating that the genome is not yet complete. Thus, protein-coding genes present in the genome of *U. compressa* showed similarity to plant and green microalgae, but also to animal, bacterial, and fungal genes. © 2022 by the authors. Licensee MDPI, Basel, Switzerland.

Author keywords

genome; marine alga; protein-coding genes; structural RNA genes; *Ulva compressa*