



Myo-Inositol-1-Phosphate Synthase

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ABSTRACT

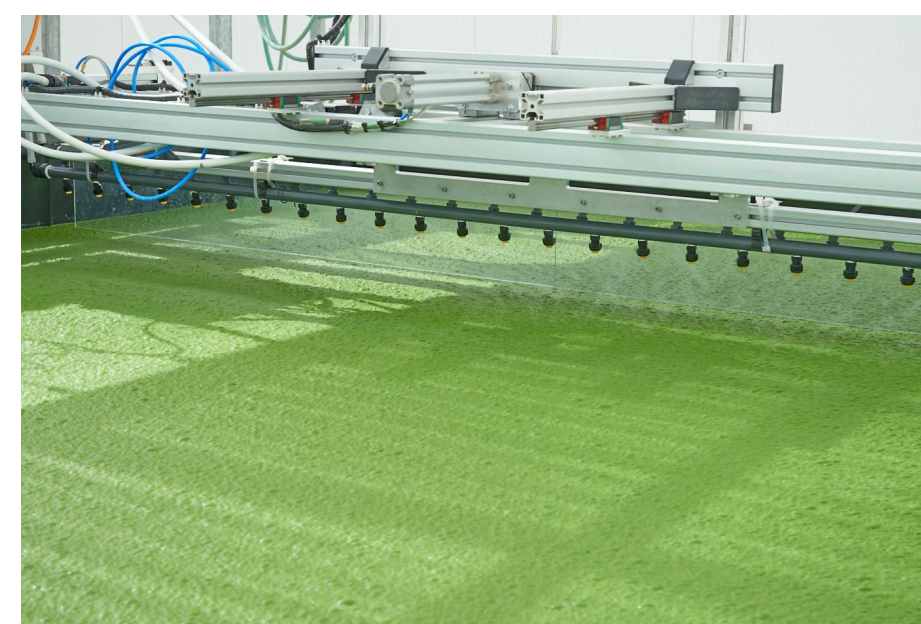


The purpose of our research was to study a specific species of Duckweed, *Landoltia punctata*, in order to further discover any other useful functions it may have. We conducted our research through a series of DNA replication and extraction, which helped us isolate a certain protein to study. Through DSAP, we conducted multiple rounds of studies and experiments on our protein sequences to narrow down their functions and relations to *Landoltia punctata*.

BACKGROUND AND INTRODUCTION

Key Benefits of Duckweed:

- Unique characteristic of being able to recover nutrients from wastewaters
- Can help us find an environmentally friendly technique of sorting nutrients through waste waters and also finding an alternative start source of fuel ethanol production
- Can also help feed animals, poultry, and fish
- Our goal is to study a specific species of Duckweed called *Landoltia punctata* and research the related proteins and functions related to this species



METHODS

1. Grew bacteria

and then transferred the cells into a tube for centrifugation in order to separate the pellet



2. PCR

was enacted on the samples in which using the enzyme DNA polymerase, a specific fragment of DNA was repeatedly synthesized



3. Ran PCR samples on Gel Electrophoresis

to determine the size and concentration of the samples



4. Mock up PCR Gel

to determine if the sample is readable and able to be sequenced



5. Plasmid Mini Prep

was when we chose a colony of bacteria and transferred it onto our pelleted cells with a series of mini-prep into to prepare the DNA



6. Restriction Digest

cut plasmid out with restriction enzymes in order to clone and analyze DNA fragments



7. Ran RDG Gel Electrophoresis



8.. Mock Up Gel

to determine the size and concentration of the DNA and also determine if it should be sent for sequencing

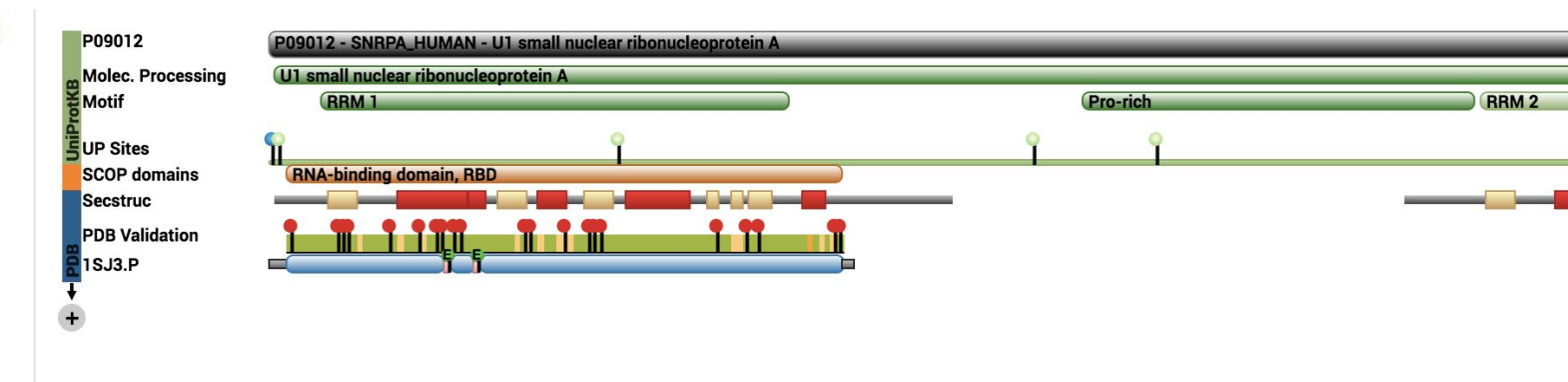
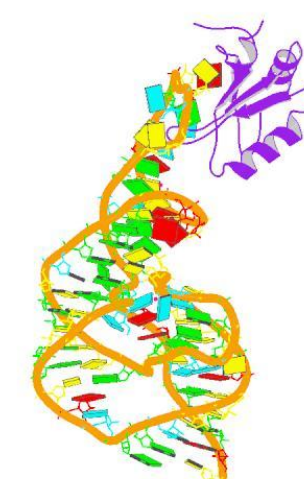
RESULTS

BLASTx					
Accession #	Definition	Organism	Query Start	Query End	E Value
OVA06804	Myo-inositol-1-phosphate synthase [Macleaya cordata]	Macleaya cordata	H3	K398	4e-84
ONL94897	low phytic acid1 [Zea mays]	Zea mays	H3	K398	4e-84
AQL09113	Inositol-3-phosphate synthase isozyme 1 [Zea mays]	Zea mays	H3	K398	2e-83

BLASTp					
Accession #	Definition	Organism	Query Start	Query End	E Value
OVA06804	Myo-inositol-1-phosphate synthase [Macleaya cordata]	Macleaya cordata	H1	K132	1e-85
ONL94897	low phytic acid1 [Zea mays]	Zea mays	H1	K132	2e-85
AQL09113	Inositol-3-phosphate synthase isozyme 1 [Zea mays]	Zea mays	H1	K132	8e-85

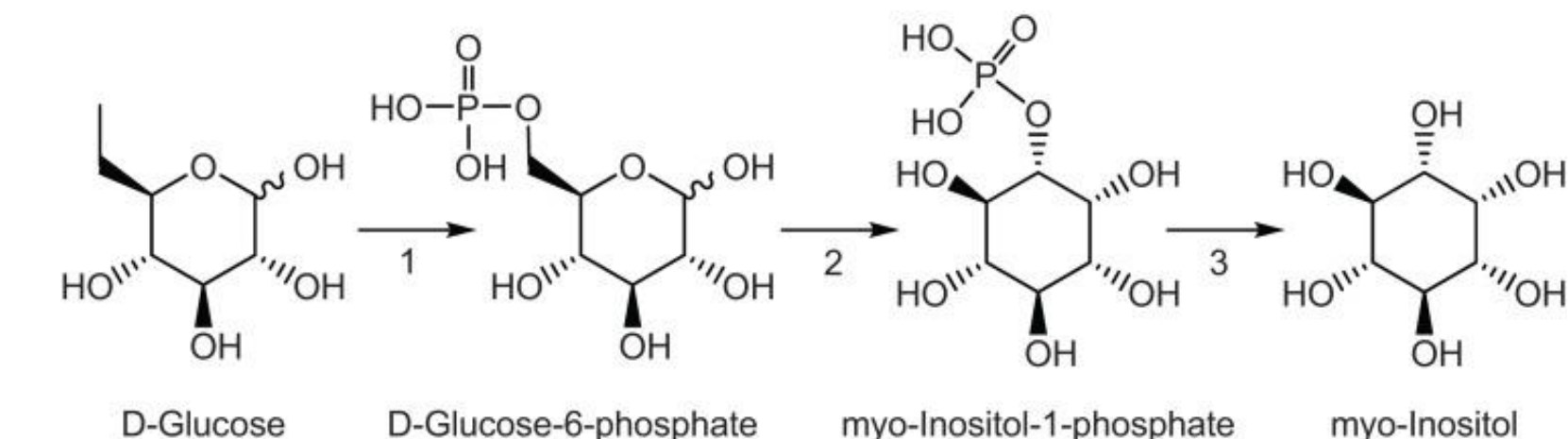
Analysis

- As shown in the table above, the BLASTx results helped narrow down the protein to some version of inositol-3-phosphate synthase and also further confirmed that the majority of organisms with this protein are from the plant kingdom.
- The BLASTn results had high E-values which didn't help much in identifying the protein but the first search result had another version of my protein. The BLASTn search showed that the majority of organisms with this protein are from the plant kingdom.
- The first search result in both BLASTx and BLASTp is the same, which we can tell from their identical accession numbers and similar query start/end values. The E-Values are also relatively similar.
- Comparing these searches helped narrow down the protein to Myo-inositol-1-phosphate synthase which is most commonly found in plants especially *Macleaya cordata* and *Zea mays*

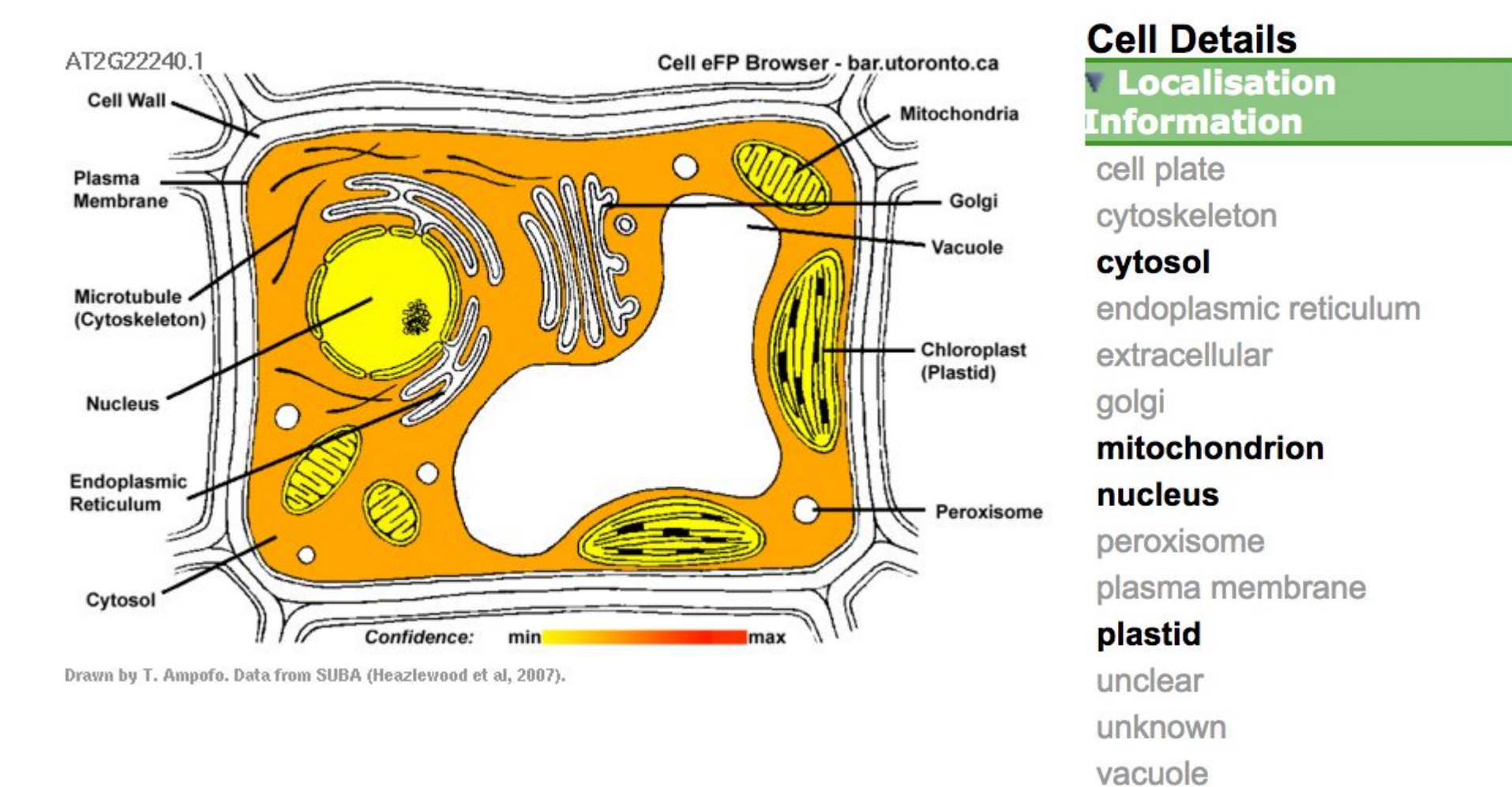


Conclusion

- **Protein Name:** Myo-Inositol-1-Phosphate Synthase
- **Protein Function:** The function of this protein is so act as an enzyme that catalyzes the conversion of D-glucose 6-phosphate to 1L-myo-inositol-1-phosphate, which is the beginning step in the production of all inositol-containing compounds (such as phospholipids)
- **Protein Domain:** originates from the inositol family
- **Related Proteins:** ISYNA1 protein, partial which serves a similar function in humans
- **Further Experiments:** Northern blots to determine if there is are other related protein in humans which would help me understand the overall significance of this protein in homo sapiens.



The conversion of D-glucose 6-phosphate to 1L-myo-inositol-1-phosphate, also shows the structure of the protein



REFERENCES

NCBI, WSSP, Journal of Biological Chemistry, and InterPro

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