



Enhancing Photosynthetic Efficiency of Plants for Biomass and Biofuel Applications



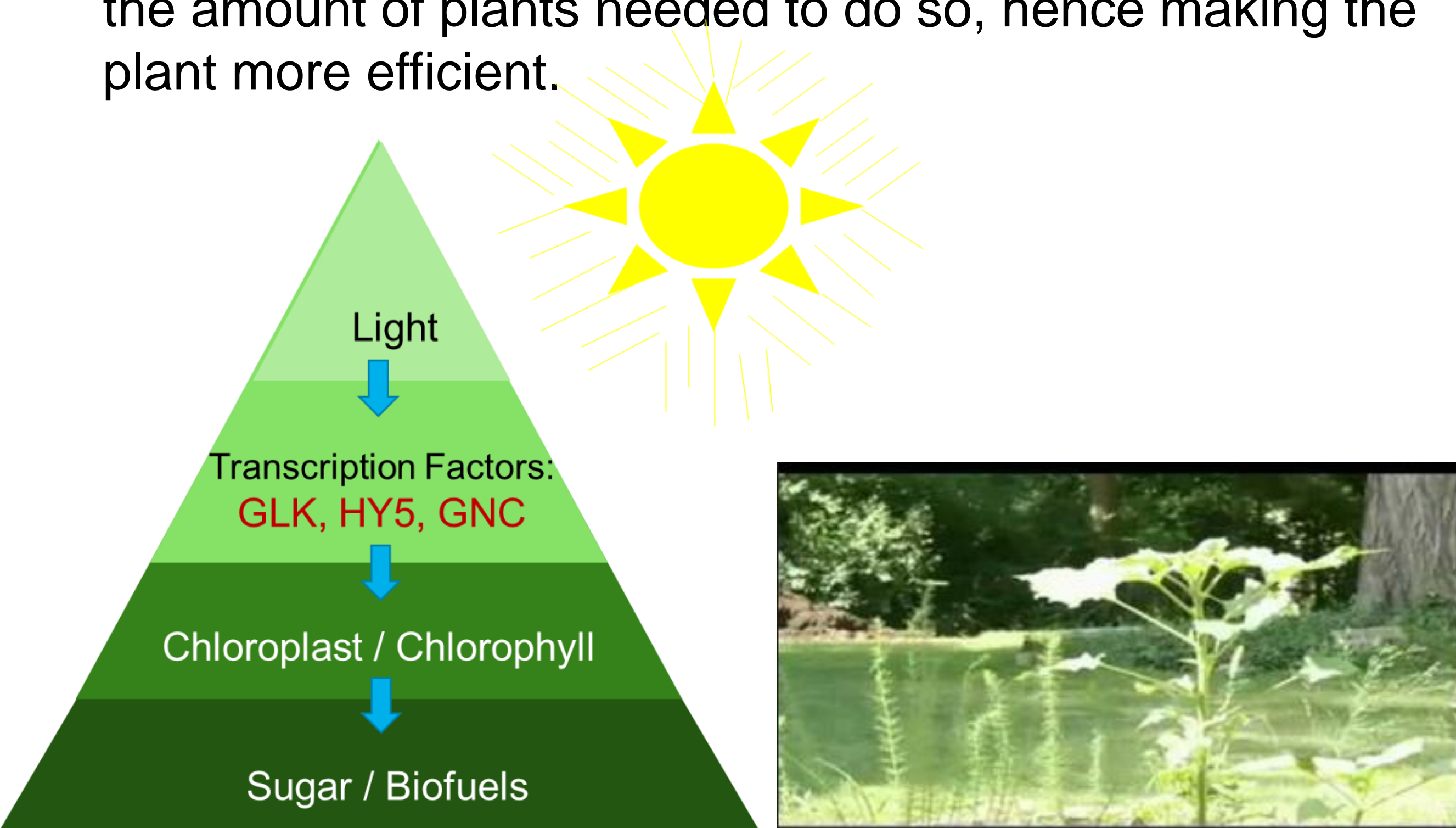
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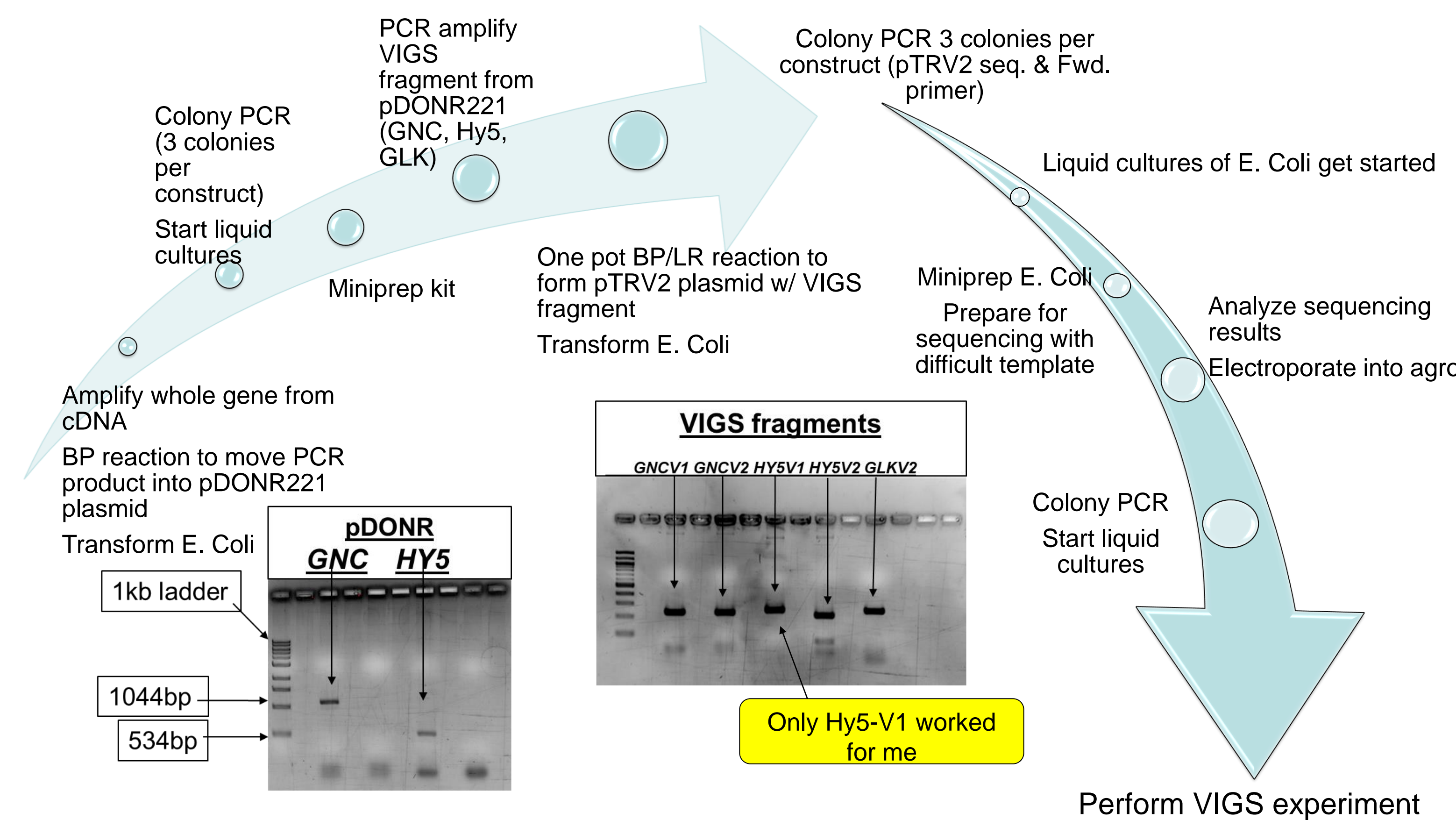
Introduction

This research was conducted in order to enhance photosynthetic efficiency of plants for biomass and biofuel production, and reduces the need for fossil fuel. The reason plant are being looked into for biomass and biofuel applications is because the more chlorophyll a plant has the more sugar it makes. By increasing the sugar content it will provide additional energy to produce additional biomass for a higher yield content of biofuel products without increasing the amount of plants needed to do so, hence making the plant more efficient.



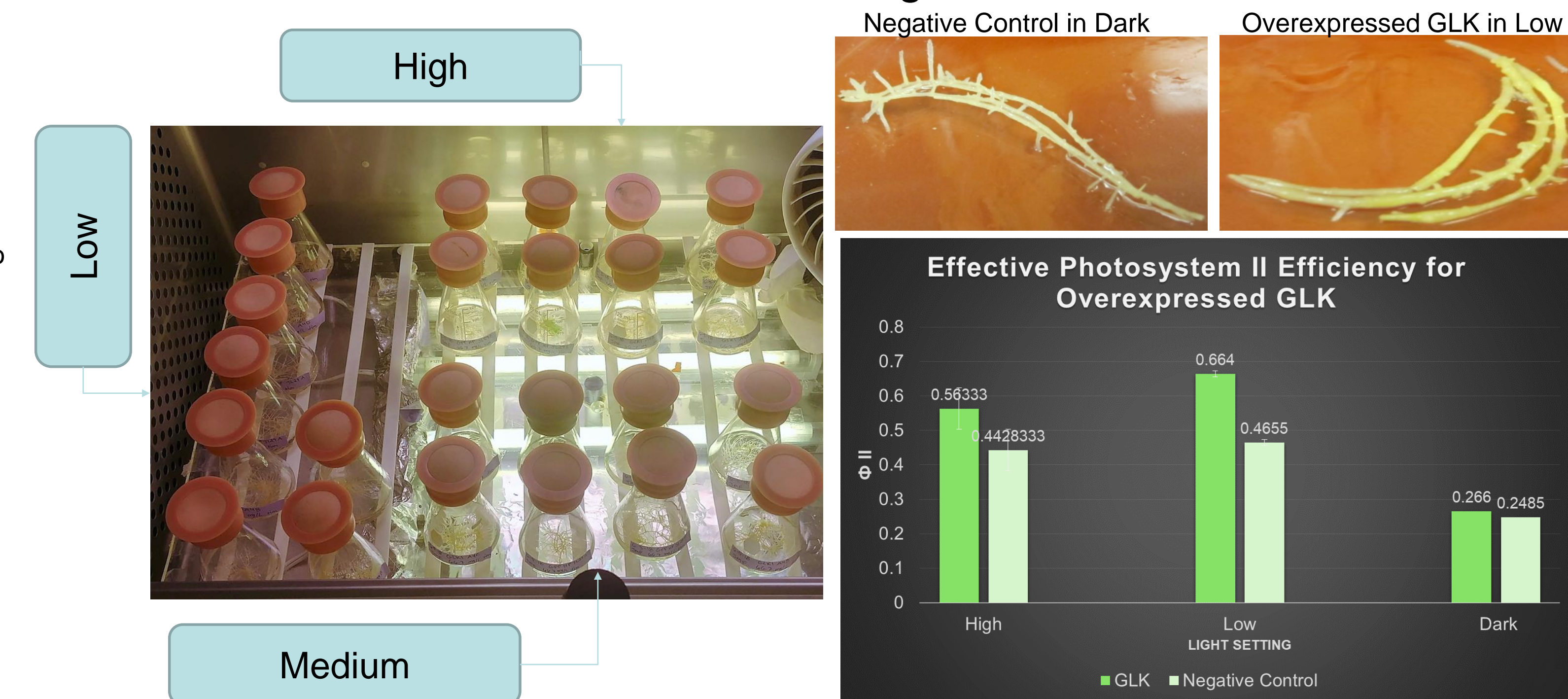
Cloning Process

Purpose: Move the gene of interest into the agrobacterium to perform the Virus Induced Gene Silencing experiment.



Overexpressed GLK Roots Light Experiment

Purpose: Find out how light interacts with the transcription factor. Once the roots were sub-cultured in the different light settings and sub-cultured once again after 3 weeks, less than a week later the roots started to turn green.



Conclusion

I was able to determine that GLK is a transcription factor in chloroplast development. I successfully accomplished:

- Cloning transcription factors (TF)
- Demonstrated decreased chlorophyll content in GLK-silenced plants
- Found increased photosynthetic efficiency in GLK- overexpressed roots
- Determined the influence of light on GLK-induced chlorophyll development

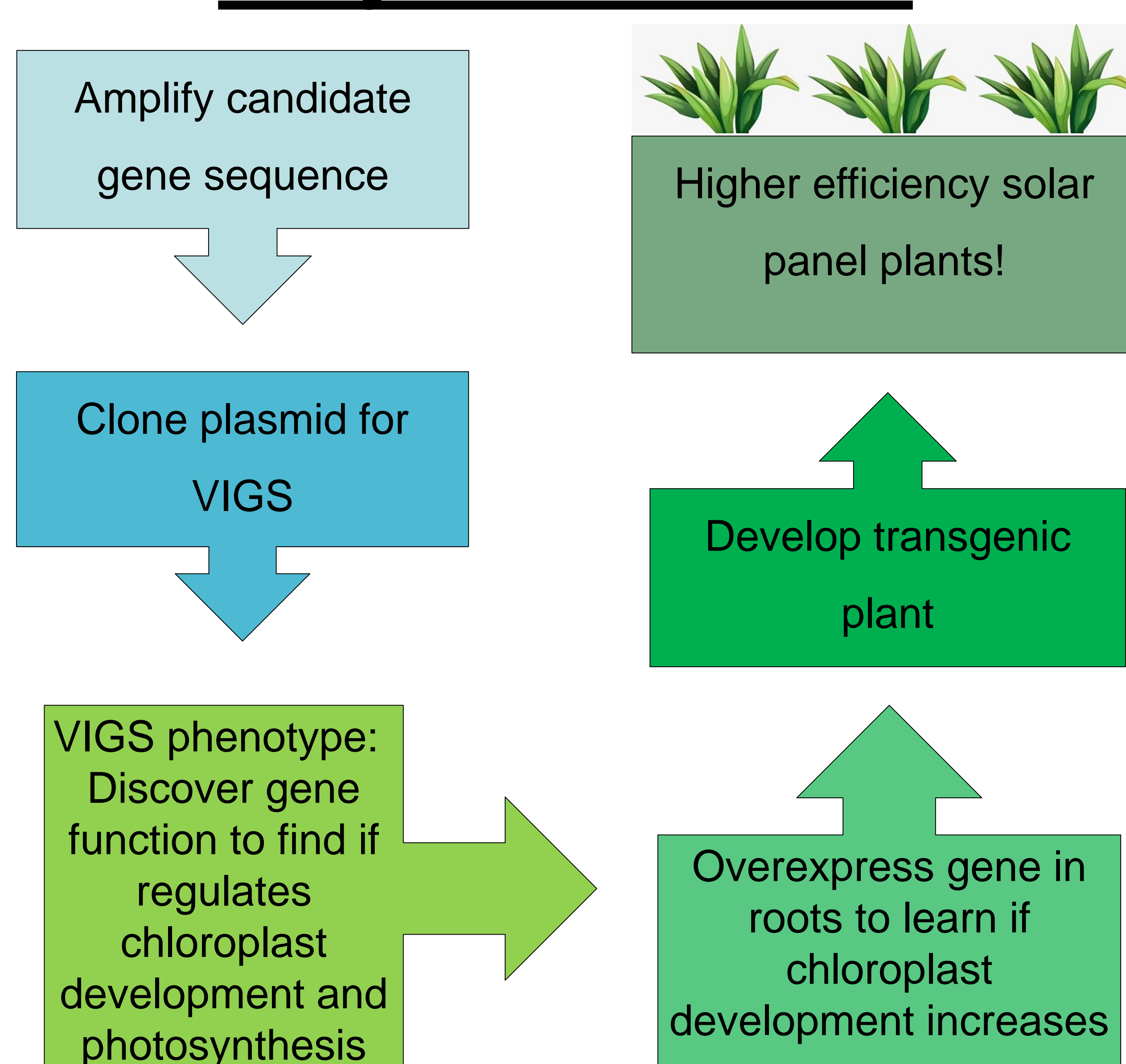
Steps Forward

- Determine the role of GNC and Hy5 in chlorophyll development:
 - ❖ Measure the phenotype of the Hy-5 VIGS plants
 - ❖ Perform VIGS experiment with GNC
- Overexpress the transcription factors in roots to see if chloroplast development increases
- Develop transgenic plants
- Ultimately, grow higher efficiency plants

Acknowledgements

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Project Overview



Virus Induced Gene Silencing (VIGS) Experiment

Purpose: Silence the gene of interest and learn if it takes part in the chloroplast development.

