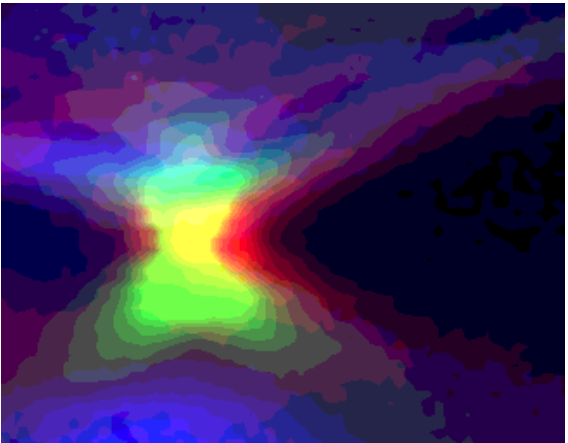


How Does CO₂ Effect Plant Cells

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Bio-Imaging Camp
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INTRODUCTION AND OBJECTIVE

By the end of the century, an over estimation of the expected amount of CO₂ in the atmosphere is 1000ppm. We want to know the effects of elevated CO₂ on chloroplasts and mitochondria present in plant cells.

Group Gold used two Arabidopsis plants; one grown in increased CO₂ conditions and the other in ambient CO₂ (380 ppm). We then peeled off the epidermis from the leaves thereby exposing the cells. Next, we analyzed the plant cells with a fluorescence microscope.

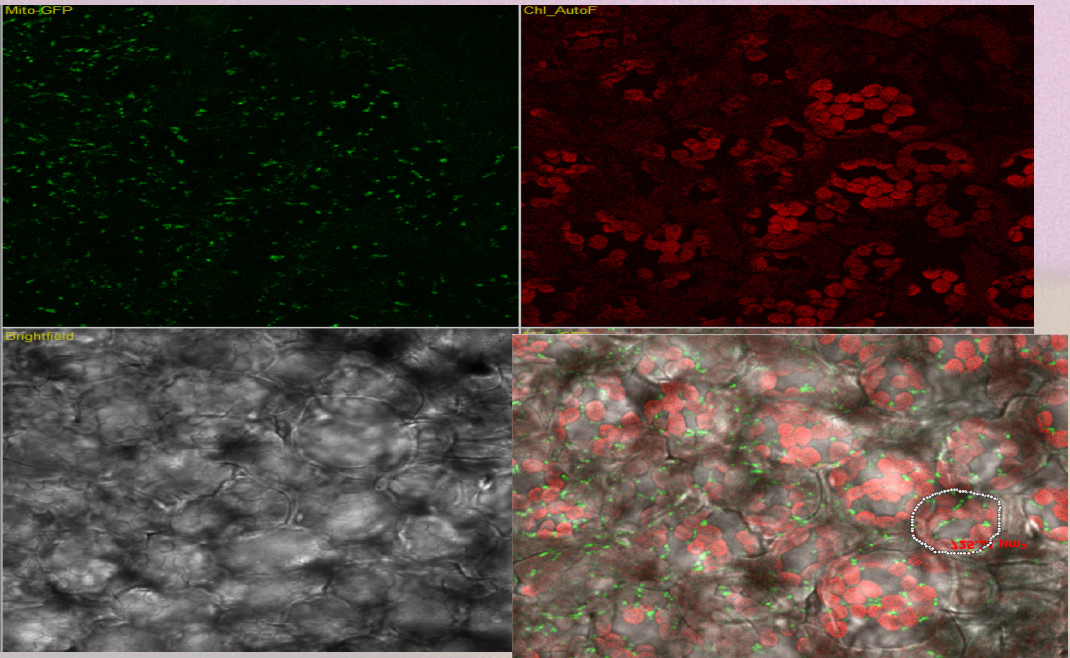
MATERIALS AND METHODS

In order to peel the leaf we use tweezers, and to separate the peeled section from the rest we use a knife. The fluorescence microscope captures the digital pictures for data analysis. To obtain a 3D image we take multiple pictures and layer them together.

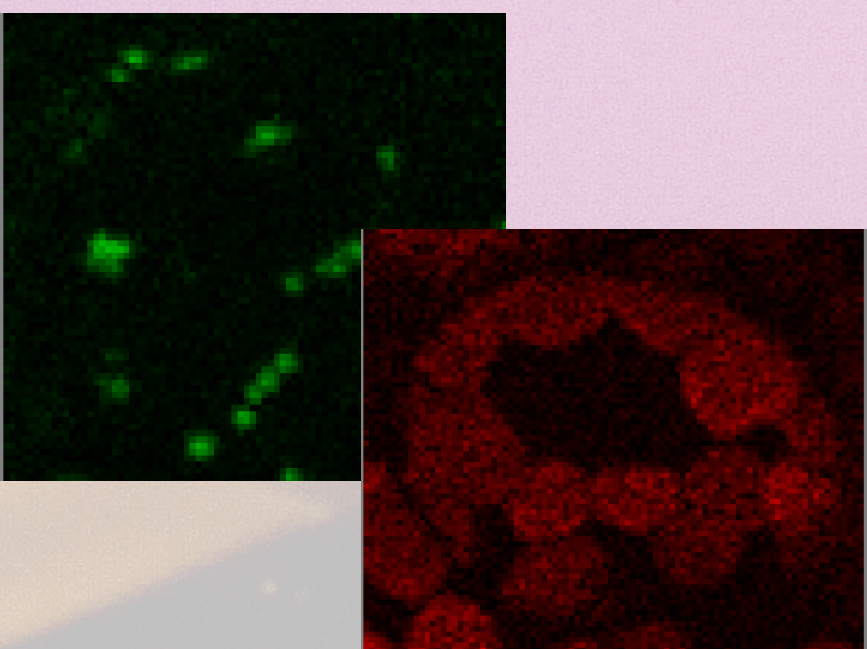


Flourescence Microscope

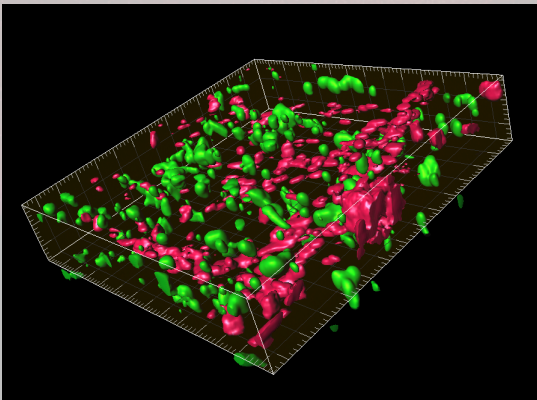
RESULTS



2D view of plant cells



Mitochondria (green) & chloroplast (red) in one cell



3D view of plant cell

Positions / Sample	Mitochondria Area μm^2	Chloroplast Area μm^2	Cell Area μm^2	Mitochondria per cell %	Chloroplast per cell %
Ambient CO ₂					
Pos-1	188.13	11.72	725.21	25.94	1.62
Pos-2	19.48	60.43	1341.07	1.45	4.51
Pos-3	28.16	27.25	1854.91	1.52	1.47
Mean	78.59	33.13		9.64	2.53
Elevated CO ₂					
Pos-1	68.99	416.26	2343.15	2.94	17.76
Pos2	64.58	968.03	2258.80	2.86	42.86
Pos-3	81.21	735.47	1272.21	6.38	57.81
Mean	71.59	706.58		4.06	39.48

DISCUSSION AND CONCLUSION

Our results showed that we didn't have enough information to make a generalization about how carbon dioxide affects respiration and photosynthesis, because we only had one sample each for ambient CO₂ and elevated CO₂. Group Gold discovered and gathered new techniques to collect samples and view them under high-powered microscopes. We absorbed and comprehended a lot of new information that can be used to change the world!!!

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