

The Future of Kleptoplasty

Jaime E. McHugh

Fort Hays State University

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Dr. Jamie Schwandt

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What on earth does Kleptoplasty mean exactly? Most people have never heard this term before and no wonder. The term itself inspires whimsical science fiction scenarios and an overall feeling of confusion and wonder simultaneously. According to the *Weird Science Journal*, kleptoplasty is the behavior of taking chloroplasts from a food source and incorporating them into the consumer's cells (*Weird Science: Kleptoplasty*, 2020). The root word klepto- comes from the Greek word for thief. Organisms capable of kleptoplasty typically eat algae or aquatic plants and “steal” the undigested chloroplasts. These chloroplasts can continue to function and provide energy for their new host via photosynthesis. Even though it is not feasible for humans to exclusively rely on solar energy, it may be possible to utilize the sun partially. Many animals have evolved to be able to do this so it is not entirely NOT possible for humans to possibly tap this resource as well someday. If humans could add chloroplasts into our cells, we would reduce or no longer need farms, mass deforestation, or food supplies to survive because life span would increase due to a reduction in malnutrition and food borne illness. If all glucose needs could be met from the sun's energy photosynthesis, which is the process of turning sunlight and carbon dioxide into oxygen and glucose, would be the only thing we need for survival.

The chloroplast is an amazing organelle that allows plants to harness the power of the sun and undergo photosynthesis, which is the process of turning sunlight and carbon dioxide, into oxygen and glucose. Imagine if humans could add chloroplasts into our cells; we would no longer need farms, mass deforestation, or food supplies to survive. The danger of starvation has plagued humans and has been a near constant threat to the survival of humans for thousands of years. We are all one massive drought, nuclear war, or economic collapse away from a global famine that would eradicate billions. The Food and Agricultural Organization of the United Nations states that 795 million people worldwide, suffered from chronic undernourishment in 2016 and it is still

unclear if the planet will be able to support the 12 billion people who inhabit it in the future (Sustainable Development Goals, 2020).

Another reason to explore the idea of kleptoplasty is that it has the potential to extend the life span of humans and would increase the quality of life due to a reduction in malnutrition and food borne illness. If all glucose needs could be met from the sun's energy, photosynthesis would be the only thing humans would need for survival. Not needing to grow food, spend money on purchasing food, and eating food could redirect energy elsewhere. Being able to rely on solar energy would also enable humans to travel in space for longer times and establish potential colonies elsewhere, such as Mars! One does need to stop and think critically for a moment though; is this even scientifically practical or feasible? Unfortunately there are some problems for humans. Humans need protein, which cannot be obtained from the sun. Aesthetically, if humans had chloroplasts in their skin they would turn green. Lastly, Humanity Plus states that photosynthesis is not an efficient process for large organisms such as humans because large creatures have a lower volume to surface ratio (Humanity Plus, 2017).

Even though it is not feasible for humans to exclusively rely on solar energy it may be possible to utilize the sun partially. Many animals have evolved to be able to do this so it is not entirely NOT possible for humans to someday tap into this resource as well. The idea of eliminating the threat of starvation and malnutrition as well as extending the quantity and quality of life has been the unicorn that man has been chasing for thousands of years. In all honesty, these outlandish notions are not completely out of reach and maybe someday in the future when technology has advanced and humans are ready to colonize other planets and solar systems that kleptoplasty will be a common household name.

References

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