DNA Reprogramming Helps Uncover Mechanisms in Photosynthesis

DNA is a vital part of all living things. It is what allows us to develop and function properly. While we cannot live without it, new technology is allowing us to now alter this once untouchable resource. DNA reprogramming has become a recent practice in a lot of research labs. It is allowing researchers to now delete, add, and even repair DNA. It also permits people to control and alter specific mechanisms in living things. This new technique has been proven to be very useful in progressing research.

At Oklahoma State University, research is now being conducted using these advanced techniques. Dr. Robert Burnap, a professor at Oklahoma State University in the Microbiology and Molecular Genetics department, is making major advancements in his research due to DNA reprogramming.

Burnaps’ main research is dealing with photosynthesis, the study of how light is converted to chemical energy. That energy then can be used to power the metabolism of living cells. Their goal is to better understand the mechanisms of photosynthesis, and to be able to utilize this process. In an interview with Dr. Burnap, he states, “Our main goal is to look into the mechanisms that create energy from the sun and CO2. We are hoping to use this data to someday create fuel from these resources, and power things like planes.” Burnaps’ research has been ongoing for the past 25 years and is currently being funded by the National Science Foundation. To reach their goal, one technique that has been proven beneficial is DNA reprogramming. By utilizing this method, they can evaluate the mechanisms in photosynthesis, and better understand how it works.

This research has been proven successful with their more recent finding. The lab evaluated and discovered how the C02-concentrating mechanism in photosynthesis operates. This mechanism allows for higher amounts of CO2 to be gathered, thus increasing the amount of energy that can be made through photosynthesis. While this is an important mechanism, there has not been a lot of research on how it works. To better understand this mechanism, they created mutations in the mechanism’s genes. Genes were deleted, added, and replaced. Once the DNA is altered, researchers would compare how the mechanism worked before, and after the alterations. This would allow researchers to see which mutations were important or not. These genetic changes were due to the software MacVector, and then created by the company Blue Heron Biotechnology Inc.

As this research continues with DNA reprogramming, it will ultimately allow more mechanisms to be fully understood. We can then take that knowledge and apply it to everyday life. If these goals are met, using this energy could allow the atmospheres CO2 to drop dramatically, helping the quality of the earth. This type of research is not just limited to plants, it can also target areas animals, or human health. In the future, we can use DNA reprograming along with other processes to make the world a healthier and more sustainable place.

References

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