



THE EFFECT OF GENE DELETION IN CASSIOPEA SPP. ON BLEACHING

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HYPOTHESIS

- ▶ If the gene is knocked out of the jelly fish, *Cassiopea* spp., it will affect bleaching

Species: spp.
Genus: *Cassiopea*
Family: Cassiopeidae
Order: Rhizostomeae
Class: Scyphozoa
Phylum: Cnidaria
Kingdom: Animalia



Cassiopea Spp. is an upside-down jellyfish occurs naturally across a broad range of tropical locations. Some species are considered invasive, and their large accumulation can adversely affect the local marine environment and affect the use of waterways. However, others, grown in Pennsylvania's labs, can help to protect the fragile coral reefs of the world's oceans.

CASSIOPEA SPP.

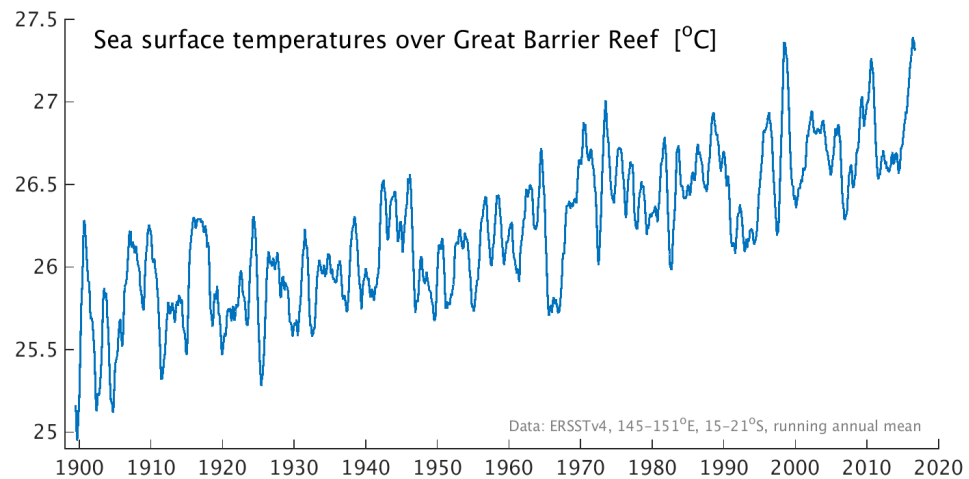


BLEACHING PROCESS

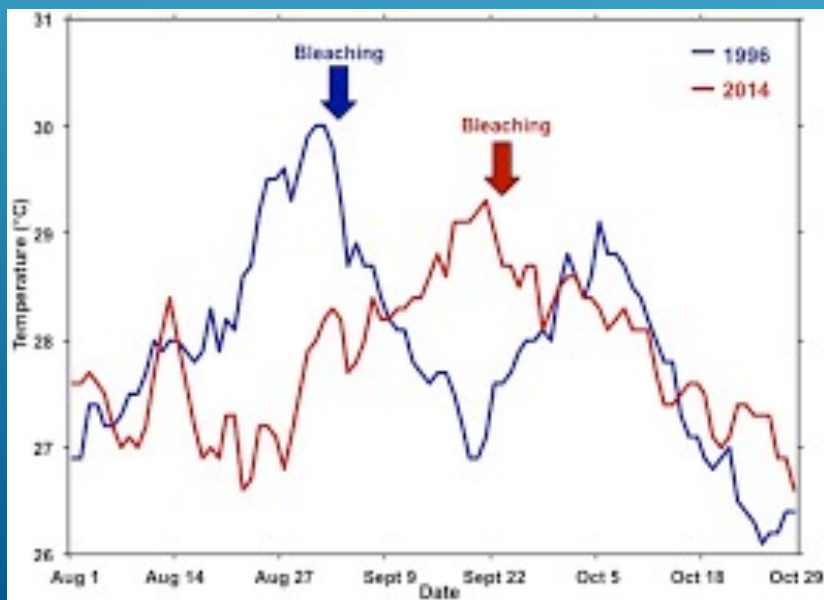
- Bleaching is when the jellyfish loses its vibrant colors and turns white. The bleaching process starts when an organism is stressed by changes in its environment. For example, change in temperature, lack or excess amount of light, change in nutrients.

BACKGROUND INFORMATION

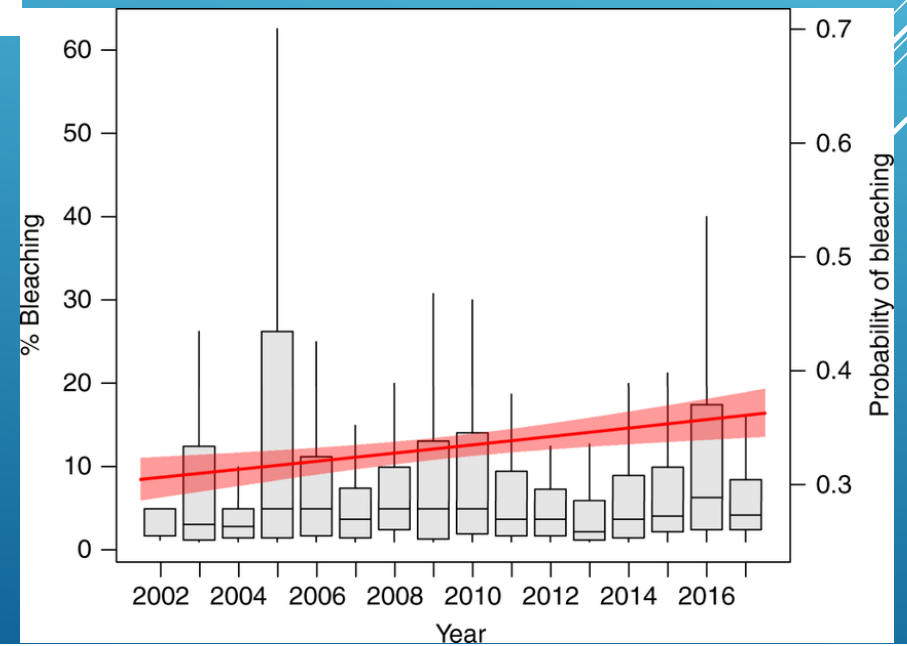




@ed_hawkins

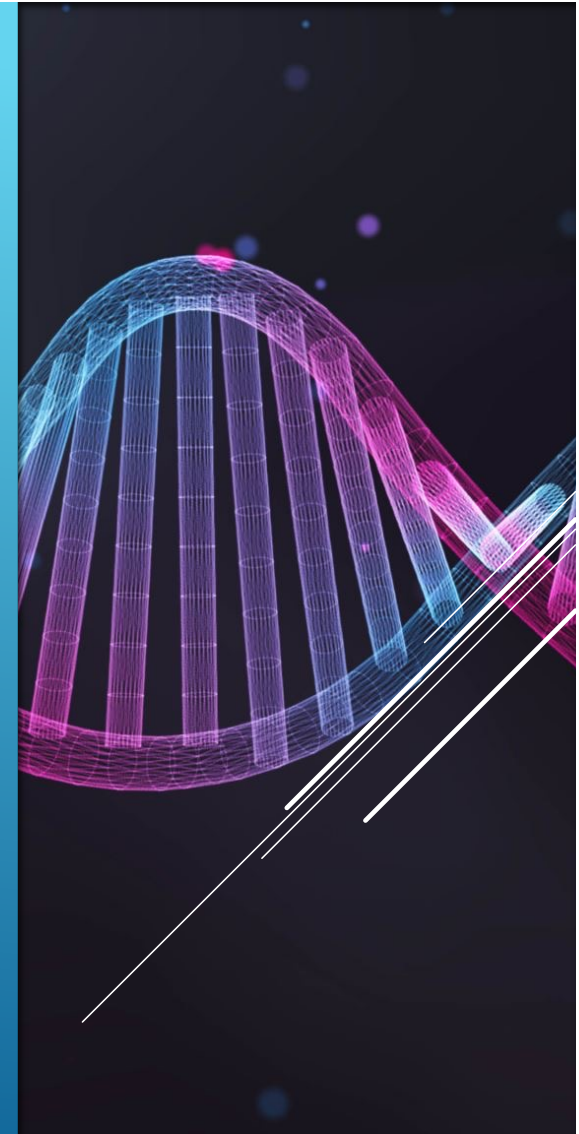


DATA



- ▶ 5HT1-A: receptor that is involved in neuroregulation.
- Why does bleaching occur, in general?
- ▶ DopR2: receptor involved in memory erosion (the geological process in which earthen materials are worn away and transported by natural forces such as wind or water)

GENES OF THE INTEREST



- Dependent variables: Bleaching effect
- Independent variables: Gene we are knocking out
- Constant factors: Nutrients for the jelly fish, temperature, climate, amount of chemicals, UV radiation
- ▶ Positive control treatments: the presence of the gene knock out effect on bleaching
- Negative control treatments: the absence of the gene knock out effect on bleaching

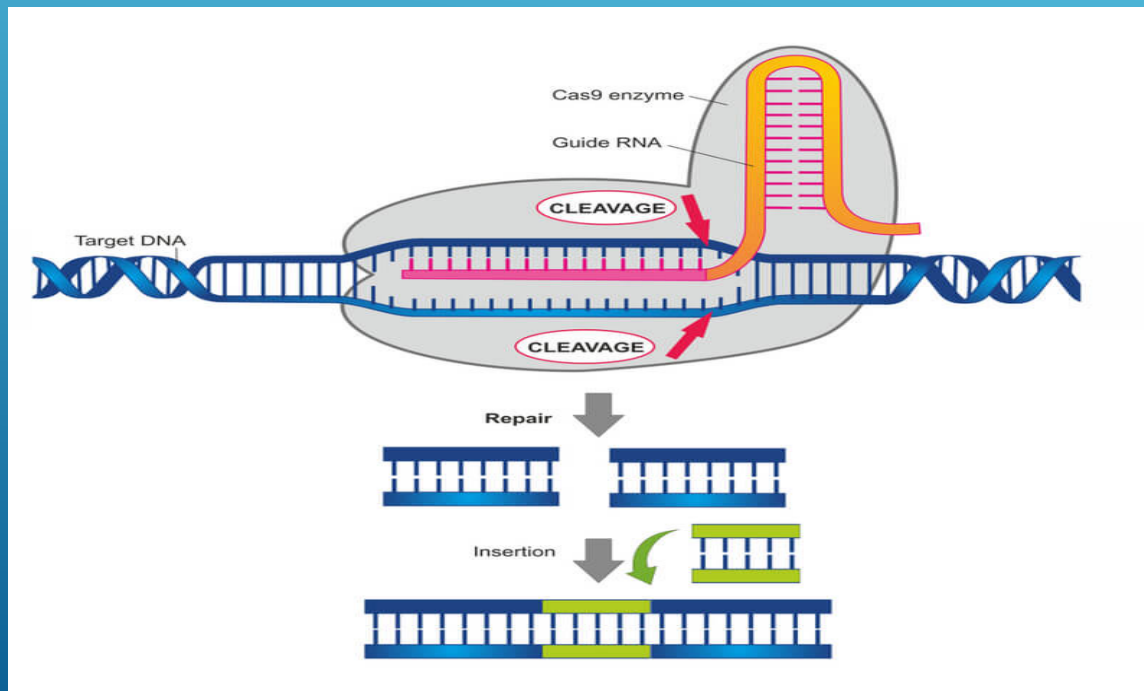
CONDITIONS OF THE EXPERIMENT



METHODS

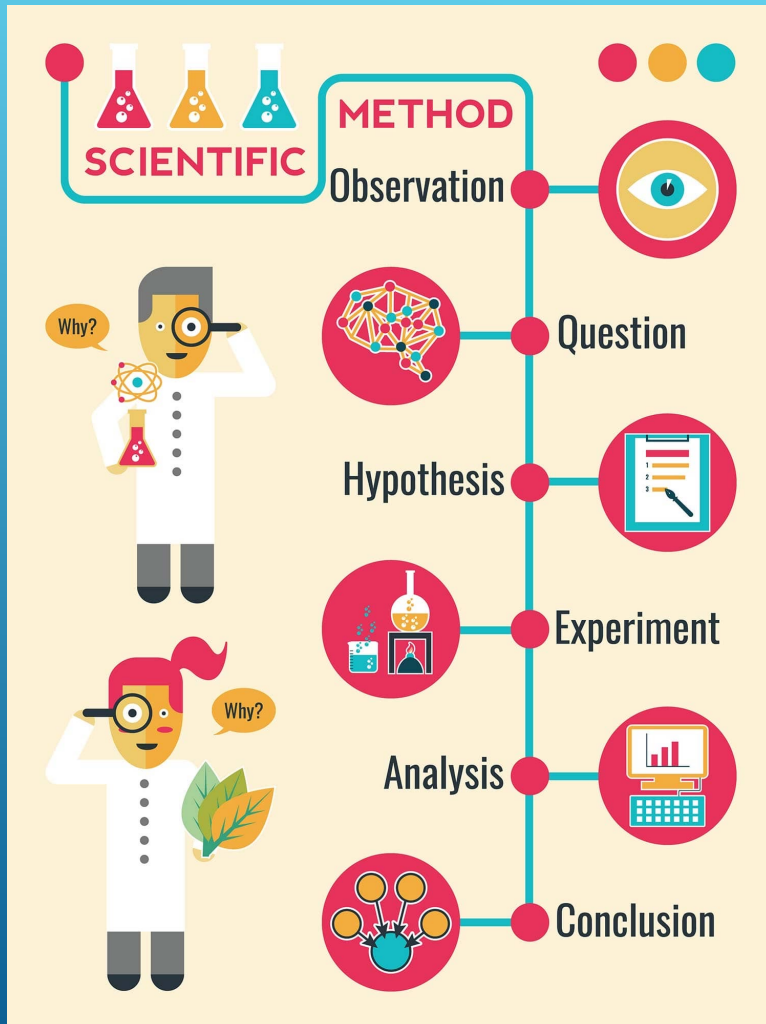
CRISPR knockout:

The CRISPR-Cas9 system is a common method used in a gene editing technologies. It is a great way of random introducing errors into the target site, which helps to identify the essential genes by first inactivating them and then determining if the cells or organisms carrying these mutations are inviable



- ▶ The sgRNA-mediated CRISPR/Cas9 is usually used to target the open reading frame of a gene in the genome and then, analyze the in-frame ($3n$) and frameshift ($3n + 1$ and $3n + 2$) mutations in the targeted region of the gene in surviving cells. If the gene is non-essential, the cells would carry both in-frame ($3n$) and frameshift ($3n + 1$ and $3n + 2$) mutations. However, the cells would carry only in-frame ($3n$) mutations if the targeted gene is essential, and this selective elimination of frameshift ($3n + 1$ and $3n + 2$) mutations of the gene indicate its essentiality.

DETAILS



The main reason that affects bleaching is a climate change. As atmosphere gets warmer, the water temperature increases as well. During this process, symbiotic algae is being ejected from the animal's tissue making it weaker and, as following, starting the process of bleaching.

Thus, if we knock out genes that are necessary for the neural response toward environmental changes, it may prevent an organism from bleaching since the effect of a climate change will not be "recognized" by an organism.

Needs to be added for the reliable conclusion:
observation, experiment

SUMMARY

THANK YOU FOR YOUR
TIME!