Bioluminescence Dreams
Can We Influence What We Dream?

Beverley Hills Primary School
Grace Guirguis
Lower Primary

Introduction

Have you ever dreamed about glowing oceans, shining forests or colorful jellyfish? This poster explores the science behind bioluminescence and dreaming and investigates whether exposure to glowing organisms could influence dream content. Understanding this relationship may help scientists learn more about how the brain processes visual experiences during sleep.(2) Research into bioluminescence and dreams has also contributed to advances in medicine, biology and our understanding of memory and brain function. (5)

What Is Bioluminescence?

Bioluminescence is the production of light by living organisms. It occurs when a chemical called **luciferin** reacts with oxygen in the presence of an enzyme called **luciferase**. This reaction releases energy as visible light while producing very little heat.

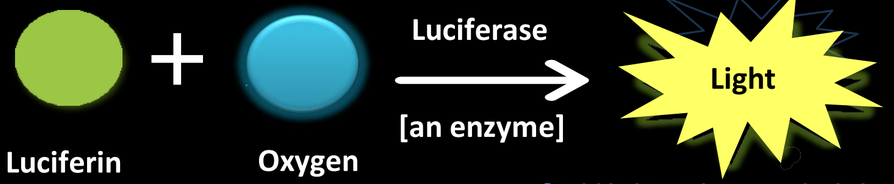
Bioluminescence organisms include jellyfish, fireflies, squid and many deep-sea fish. Scientists estimate that a large proportion of animals living in the deep ocean can produce light.(2) (Figure 1)

Organisms use bioluminescence for many reasons. Some use light to attract mates, communicate or lure prey, while others use it to avoid predators. For example, some squid release glowing clouds into the water to confuse predators and escape.

How Does The Brain Create Dreams?

Dreams occur during sleep, especially during a stage called Rapid Eye Movement (REM) sleep. During REM sleep, the brain remains highly active while the body rests (2). Brain regions involved in memory and emotion become more active, while areas responsible for logical thinking are less active (1). As a result, stored memories, feelings and experiences can be combined in unusual ways to create dream scenes and stories. Researchers believe this activity helps the brain process information, strengthen learning and organise memories.(1) (Figure 2)

HOW BIOLUMINESCENCE WORKS



REM Sleep Dream



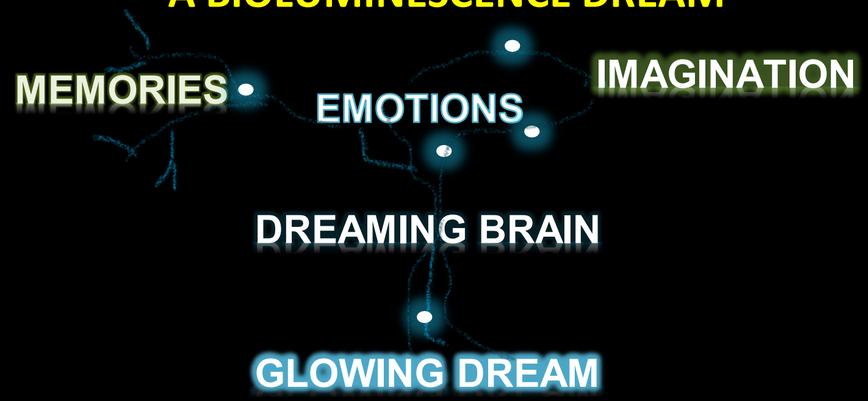
Awake
Brain is active and alert

Light Sleep
Body relaxes, brain begins to slow down

Deep Sleep
Body rests and repair itself

REM Sleep
Brain becomes very active. Dreams happen!

A BIOLUMINESCENCE DREAM



How Bioluminescence Dreams May Occur?

Scientists know that dreams are influenced by memories and experiences from waking life (1). Research shows that information encountered before sleep can sometimes appear in dream content. Because bioluminescent organisms produce their own colorful, glowing light (2), learning about or viewing them before sleep may influence dream imagery and increase the likelihood of dreaming about glowing animals or environments. Further research would be needed to test this idea.

Significance and Impact

Research into bioluminescence has led to important advances in science and medicine. Scientists use bioluminescent proteins from organisms such as jellyfish to study cells, track disease and develop new medical treatments (3). Bioluminescence is also used in environmental research to help scientists understand and monitor marine ecosystems. (2). Dream research helps scientists understand how the brain processes memories, emotions and experiences during sleep. Studies have shown that information learned before or during sleep can influence dream content and memory formation (4). By studying both bioluminescence and dreams, scientists can better understand how real-world experiences affect the images that appear in our dreams and improve our knowledge of the brain, sleep and the natural world (5).

Did YOU KNOW?

- People typically experience several dreams each night during different stages of sleep, but many dreams are not remembereded after waking (5).
- In the 1960s, scientist Osamu Shimomura discovered Green Fluorescent Protein (GFP) in the crystal jellyfish (Aequorea vicrotia), a breakthrough that transformed medical and biological research (3).

References

(1) G. William Domhoff,2018 The Emergence of Dreaming. Oxford University Press. Dreams.ucsc.edu/TEOD/. Accessed June 21, 2026, 11:10 AM.
(2) National Geographic Society https://education.nationalgeographic.org/resource/bioluminescence/ Accessed June 11, 2026, 6:30 PM.
(3) Nobel Prize (Green Fluorescent Protein, 2008) Press release: The Nobel Prize in Chemistry 2008 - NobelPrize.org Accessed June 06, 2026, 4:15 PM.
(4) Dream research (MIT Media Lab, 2020) A New Way to Control Experimentation with Dreams – MIT News Accessed June 07, 2026, 1:25 PM.
(5) National Sleep Foundation. (2024) What is REM Sleep? What is REM Sleep? - National Sleep Foundation Accessed June 14, 2026, 3:25 PM.

Special thanks to:

- Mrs Di Iizio, for her invaluable guidance, encouragement and support throughout the research and development of this scientific poster.
- Sally Saad (Mum), who assisted me in the visual elements and support throughout the research.
- George Guirguis (Dad) for his guidance on the presentation.
- ChatGPT by OpenAI was used to make long facts shorter, make sentences easier to read, and help with listing my sources. I used instructions like “Summarize this text,” and “Reword for clarity”. I checked all the text myself and changed it to make sure it shows my own learning and my own work.