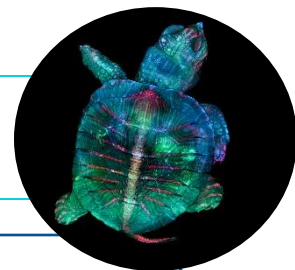


THE CHEMISTRY OF BIOFLUORESCENCE



Biofluorescence vs. Bioluminescence

Biofluorescence is a trait of an organism (any living thing) where light that hits the organism is re-emitted at a longer wavelength. To understand biofluorescence, we must understand the difference between biofluorescence and bioluminescence. Let's watch this video to begin to understand the difference:

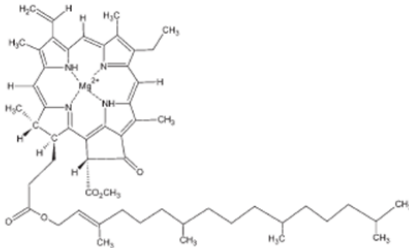
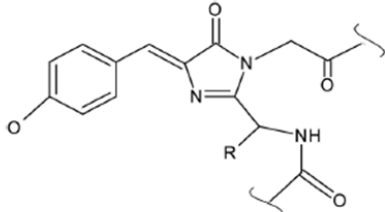
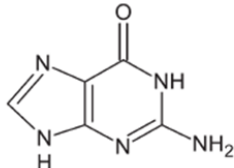
<https://youtu.be/jp-iYVktx7s>

Describe the *chemical* difference between biofluorescence and bioluminescence in your own words:

Biofluorescence:

Biofluorescence is the result of natural fluorophores (chemicals that fluoresce). There are many natural fluorophores, all organic chemicals with their own fluorescent emission wavelength.

Here are a few examples of some of the chemicals underlying the fluorescence we see in living organisms.

Fluorophore name or family	Structure	$\lambda_{\text{abs}}/\lambda_{\text{em}}$ (nm)	Ref.
Chlorophyll- <i>a</i>		480 and 680/680-690 and 730-740 (intact leaves)	21, 32
Green fluorescence protein		395 and 470/509 and 540	142, 189
Guanine		500-570/584-699	172, 190

What similarities and differences exist between the structures of the fluorophores?

Do you recognize any of the names? Where have you heard them before?

Case Study:

Choose one example of a fluorophore and write a paragraph answering the case study questions below.

1. Which fluorophore did you choose?
2. Draw the structure of the fluorophore
3. Describe the fluorescence the fluorophore produces (wavelength, color, etc.)
4. In what organism(s) or material(s) is the fluorophore found?
5. What further questions about the fluorescence of your fluorophore do you have/want to explore?