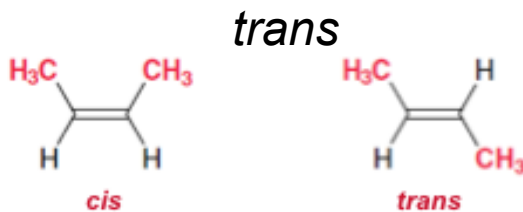
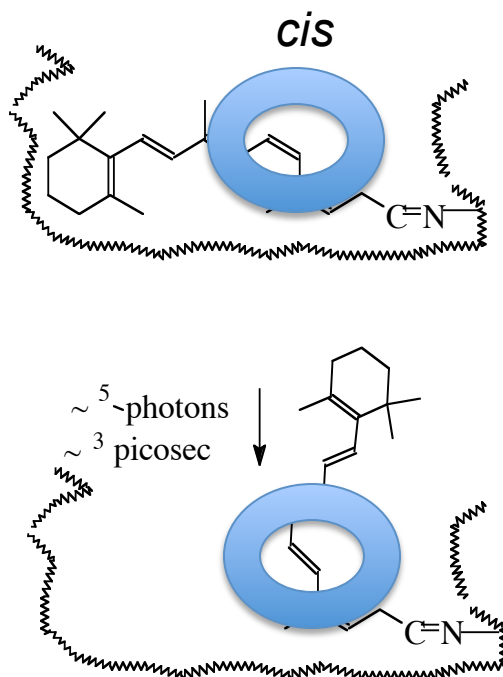
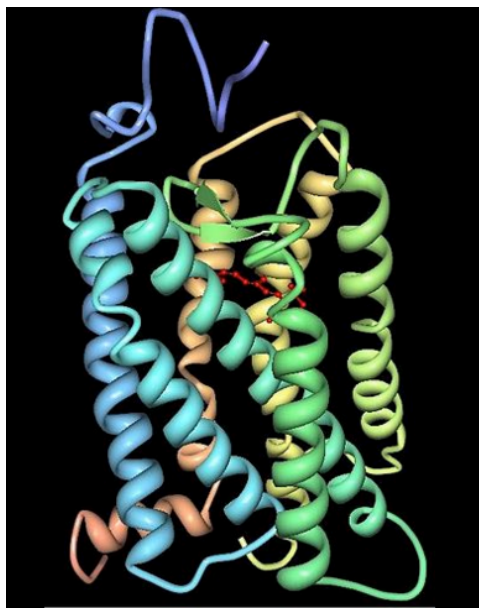


Halloween: “All Hallows Eve”?



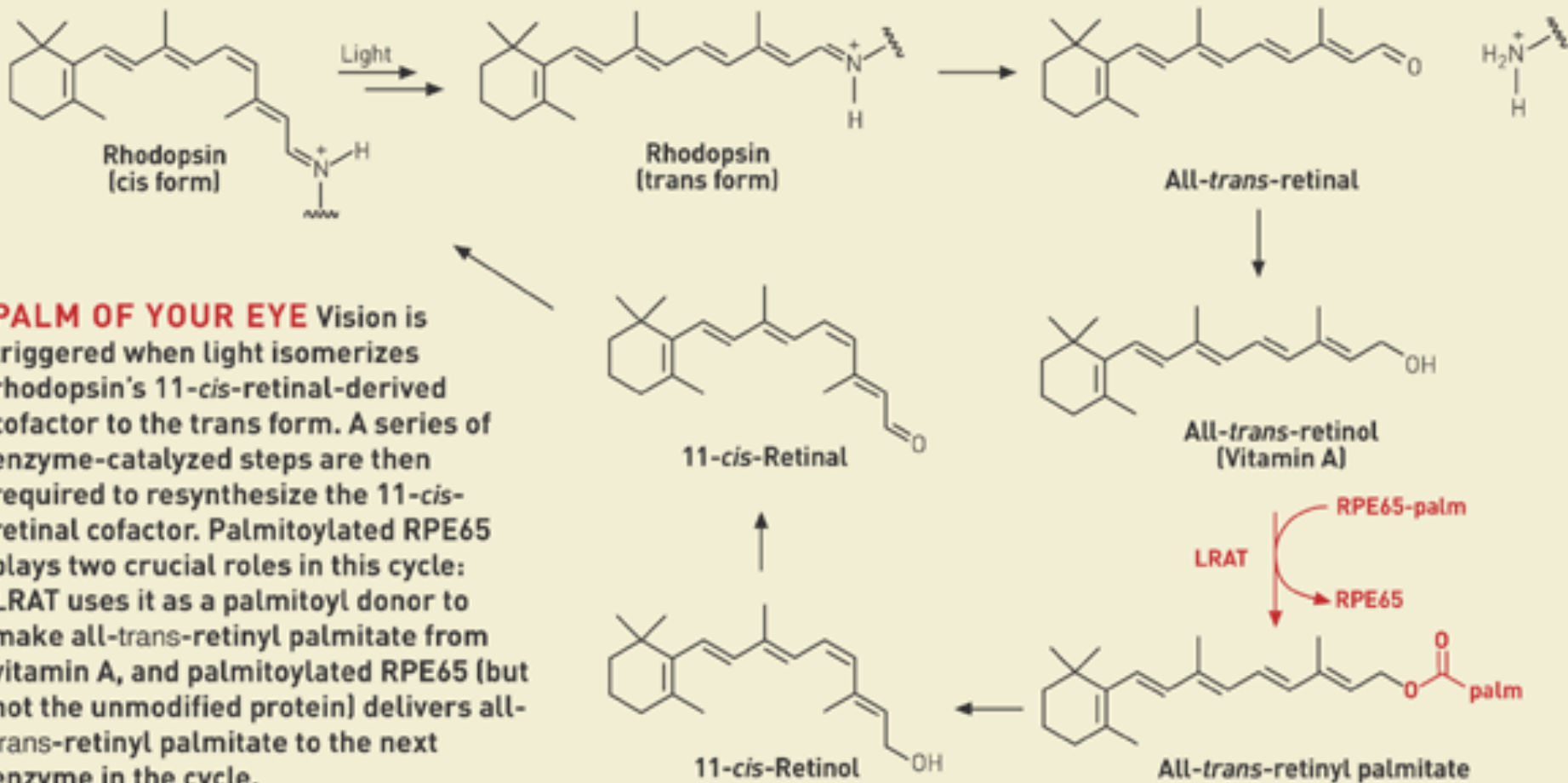
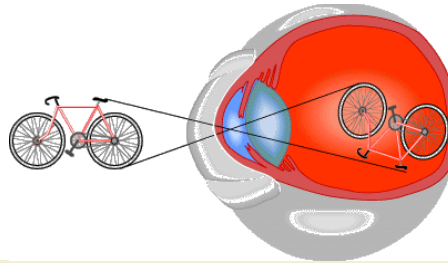
Do you believe in Vampires & their  
thirst for blood.....?

# Light & The Chemistry of Vision

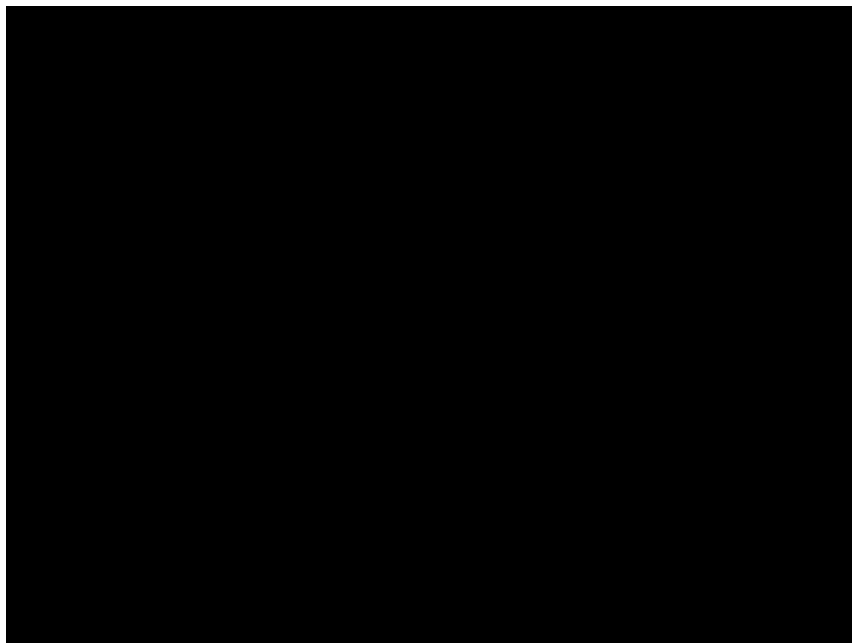
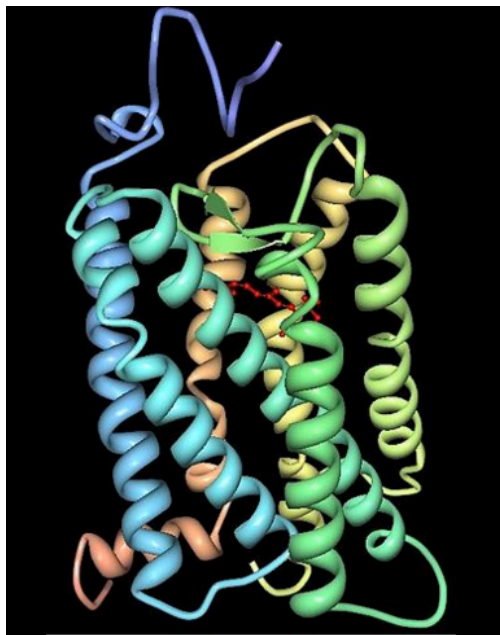
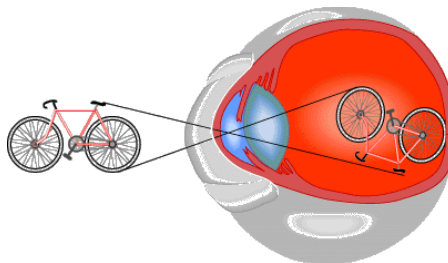


Color of  
Blood  
&  
Vampires

# B&W vs. **Color** vision : Rods vs. **Cones**



## B&W vs. **Color** vision : Rods vs. **Cones**

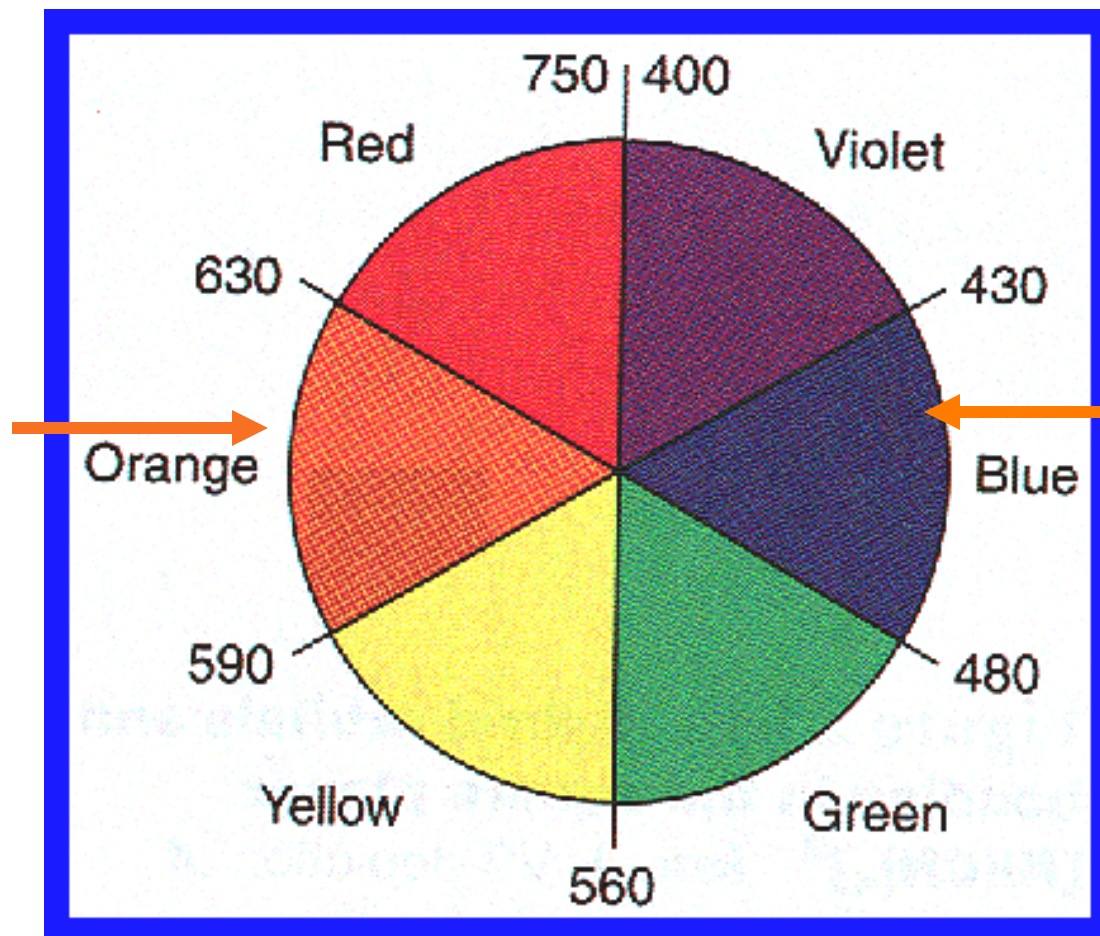


### Color Vision Experiment/Exercise

<http://chemconnections.org/organic/chem227/227assign-06.html#vision>

Observed  
color

(nm)



Absorbed  
color

(nm)

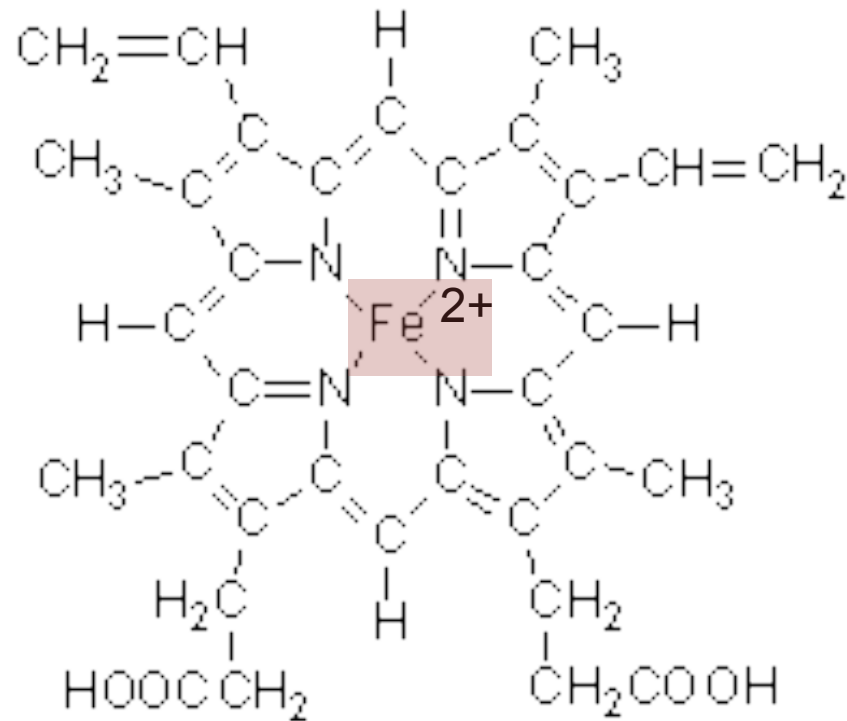


## *Colors of Blood*

- Result from absorption of visible radiation by hemoglobin:
  - A protein that contains Fe(II) bonded through d-orbitals to an organic molecule referred to as porphyrin
  - Occurs when radiation has the quantum energy needed to raise an  $e^-$  from its ground state to an excited state
  - Oxygenated blood is **bright red  $\lambda \sim 620 \text{ nm}$** ; Deoxygenated blood is **dark bluish-red**

[https://www.youtube.com/watch?v=8OC5rji1stI&feature=push-u&attr\\_tag=uR2iOHN7\\_TVAYFW5-6](https://www.youtube.com/watch?v=8OC5rji1stI&feature=push-u&attr_tag=uR2iOHN7_TVAYFW5-6)

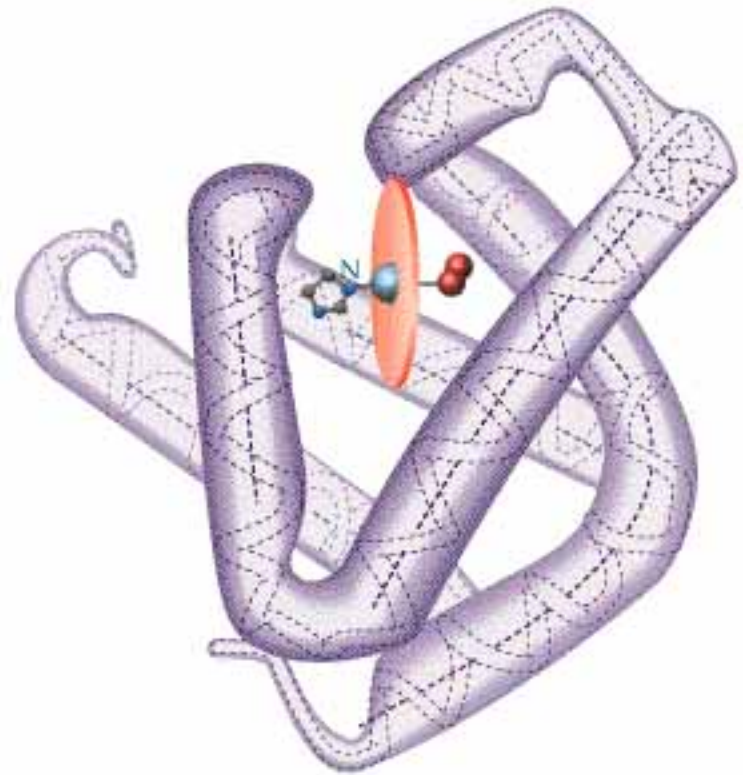
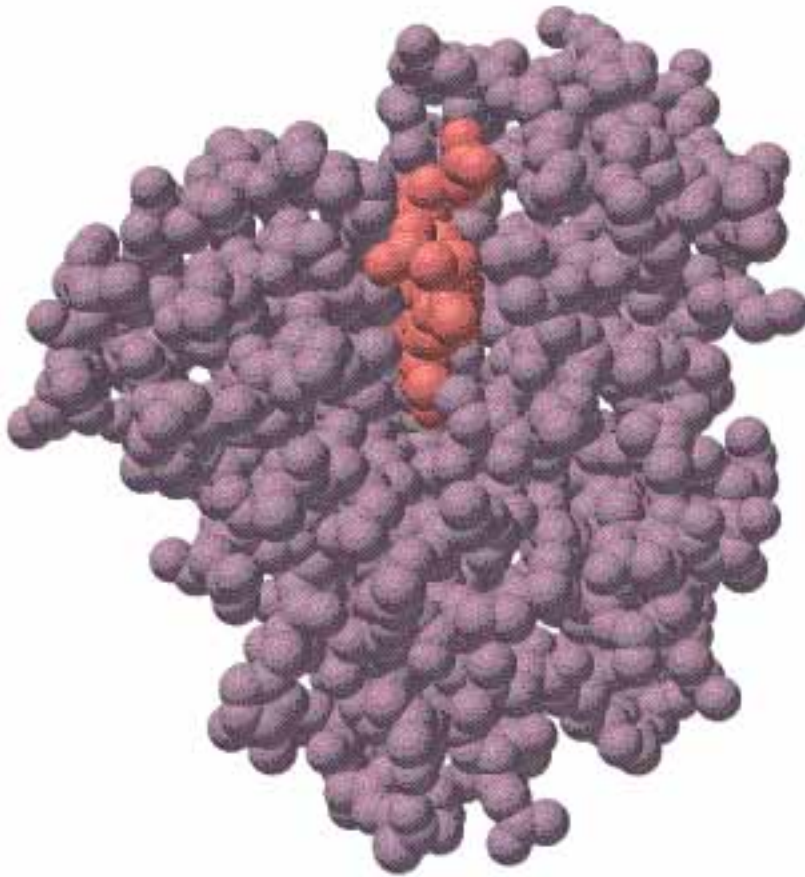
# Iron (II) plus Porphyrin



heme

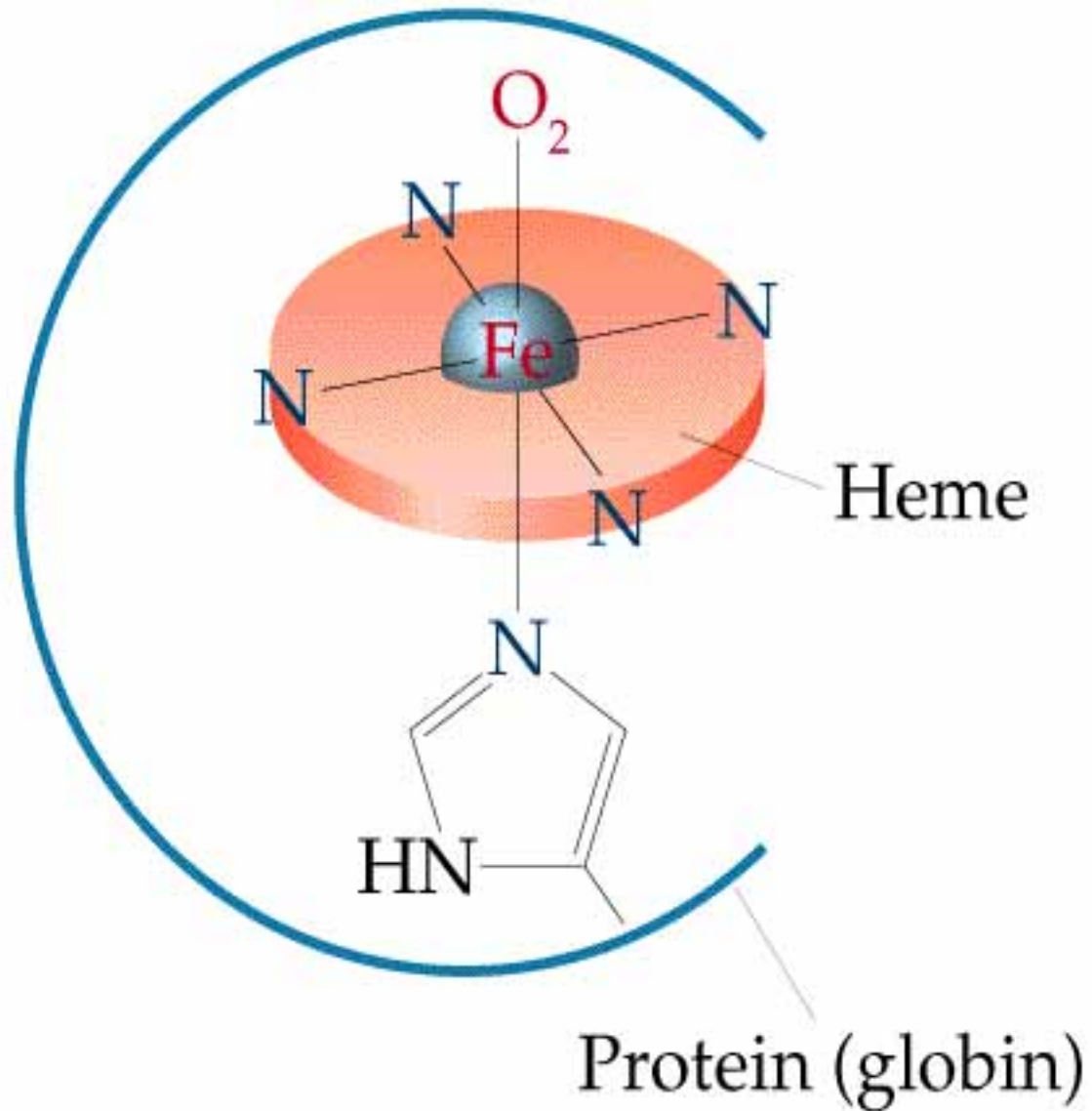
<https://www.youtube.com/watch?v=WLI1ooXfEVs>

# Hemoglobin & Myoglobin proteins that transport and store $O_2$





## $\text{Fe}^{2+}$ in Oxymyoglobin and Oxyhemoglobin



Did you ever have a vampire encounter?  
Is Bram Stoker's "Dracula" pure fiction?

*Do vampires have any preference arterial or  
venous blood?*



Vampires & Porphyria?  
[Edvard Munch](#)

# Porphyria

<http://en.wikipedia.org/wiki/Porphyria>

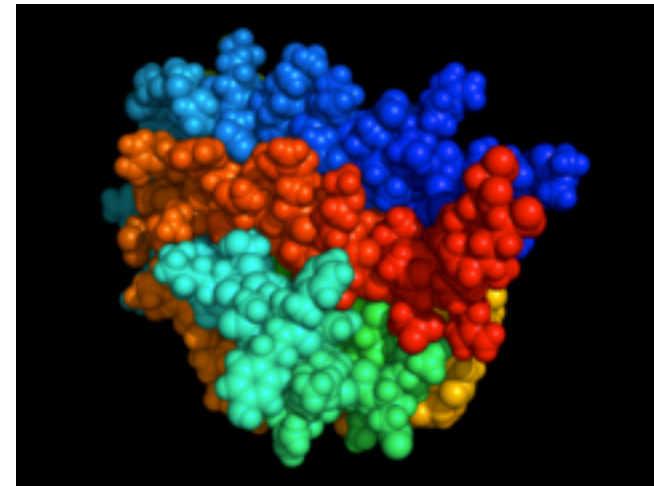
## Erythropoietic porphyria symptoms:

Severe photosensitivity, swelling, pain, and burning; requires avoidance of bright sunlight; produces brown canine teeth that fluoresce in ultraviolet light; produces hemolytic anemia.

Drinking large quantities of blood can alleviate the symptoms. Garlic activates an enzyme that destroys them faster and makes the symptoms of porphyria worse.

Q. "Why is a baby like a vampire?"

A "Because it sleeps all day and feeds all night."



# The Day after All Hallows Eve

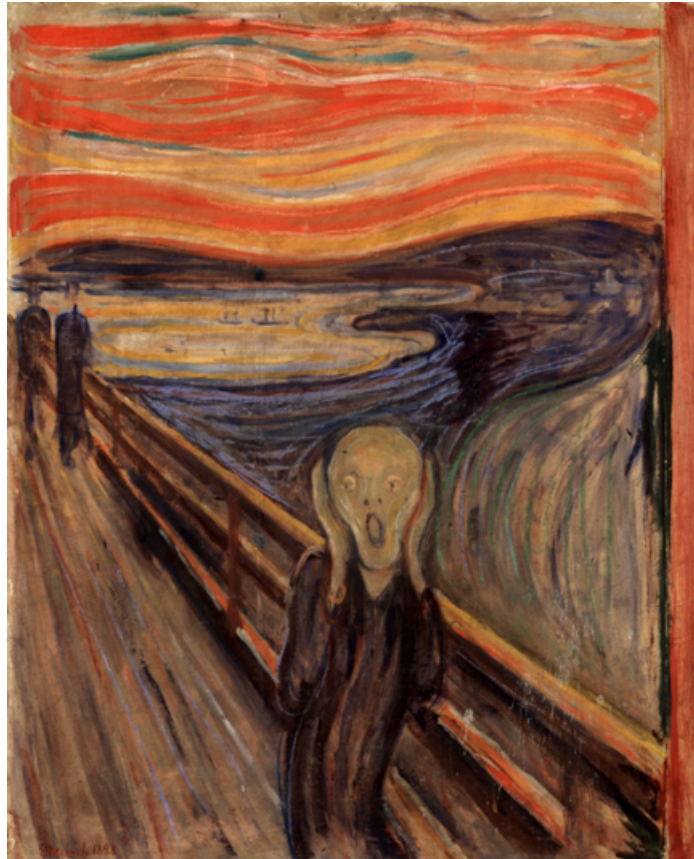


**Día de los Muertos / Day of the Dead**

# Edvard Munch

(1863–1944)

SF MOMA July 1-October 5, 2017



[Edvard Munch](#)