

# Periodic Graphics

A collaboration between C&EN and  
Andy Brunning, author of the popular  
graphics blog *Compound Interest*

More  
online

To see more of  
Brunning's work, go to  
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To see all of C&EN's  
Periodic Graphics, visit  
cenm.ag/periodicgraphics.

## Porphyria and the vampirism myth

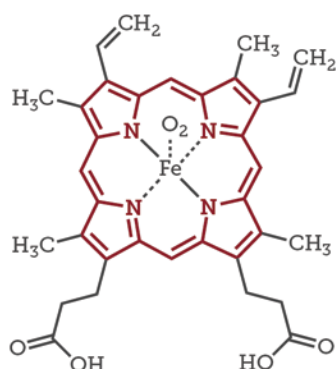


Many sources claim that porphyria, a rare group of disorders, inspired the vampire myth. But the evidence for this and the biochemistry behind the proposed parallels don't hold up to scrutiny.



### What is porphyria?

Porphyria is a group of genetic disorders. The name comes from *porphyrin* molecules, which the body uses as building blocks to make heme. Porphyria causes deficiencies in enzymes the body uses to make heme, so in an attempt to maintain sufficient heme production, the body overproduces porphyrins.



**Heme B**

Porphyrin structure highlighted and bolded

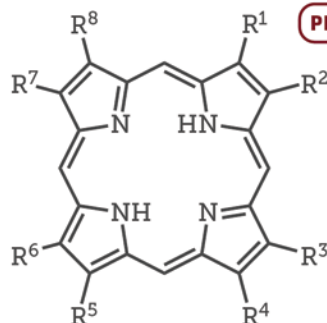
Found in hemoglobin, heme B is the red protein that transports oxygen in our blood.

Porphyrin buildup causes symptoms that vary depending on the type of porphyria.

### Contrasting porphyria and vampirism

Like the vampires of some stories, people with some porphyrias experience skin damage and blistering in sunlight. Accumulated porphyrins in the skin absorb light and generate radicals that cause the damage.

### Photosensitizing porphyrins



#### Uroporphyrin III

$R^{1,4,5,7} = \text{CH}_2\text{COOH}$

$R^{2,3,6,8} = \text{CH}_2\text{CH}_2\text{COOH}$

#### Coproporphyrin III

$R^{1,3,5,8} = \text{CH}_3$

$R^{2,4,6,7} = \text{CH}_2\text{CH}_2\text{COOH}$

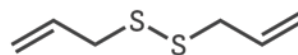
#### Protoporphyrin IX

$R^{1,3,6,7} = \text{CH}_3$

$R^{2,8} = \text{CH}_2\text{CH}_2$

$R^{4,5} = \text{CH}_2\text{CH}_2\text{COOH}$

Unlike vampires, people with porphyria needn't fear garlic. Allyl disulfide in garlic boosts the production of an enzyme that breaks down heme, but not sufficiently to be a problem for people with porphyria.



**Allyl disulfide**

While mythical vampires crave blood, there's no evidence that drinking blood eases porphyria's symptoms. Most people with porphyria do not need extra heme from external sources. Even if they did, drinking blood would not solve this; intestinal enzymes break down the heme in hemoglobin.