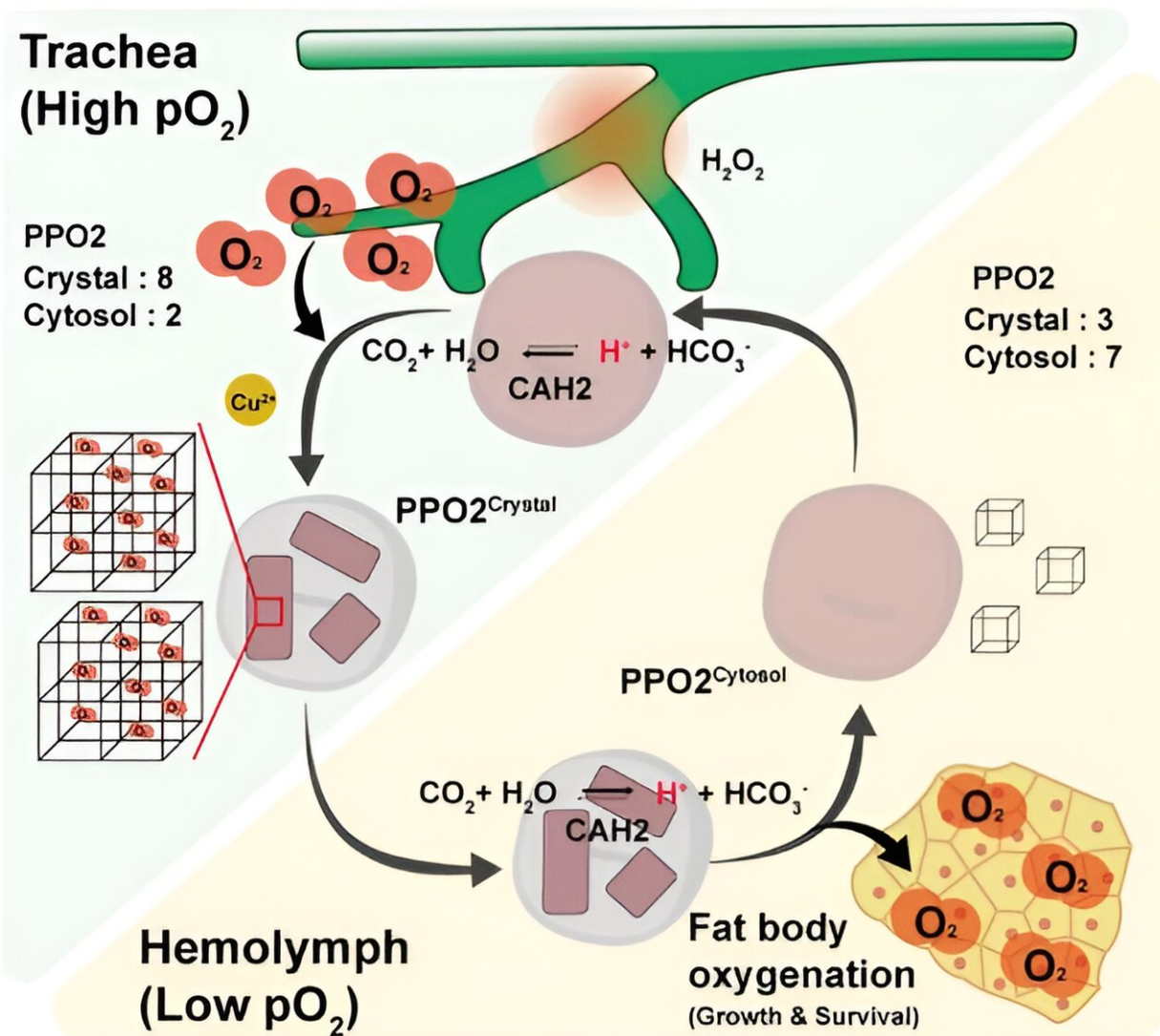


# Researchers determine that crystal cells in fruit flies help transport oxygen throughout the body

June 27 2024, by Bob Yirka



PPO2 in the crystal cell controls internal oxygen homeostasis and undergoes a

phase transition between a crystalline form that acquires oxygen from the trachea and a cytosolic form that releases oxygen to oxygenate the fat body. Credit: *Nature* (2024). DOI: 10.1038/s41586-024-07583-x

A team of life scientists at Hanyang University, in Korea, working with a pair of colleagues from the Korea Advanced Institute of Science and Technology, has found that fruit flies use crystal cells to transport oxygen throughout their bodies.

In their [study](#), published in the journal *Nature*, the group studied crystal [cells](#) in the flies and carried out experiments to better understand their function.

Stefan Luschnig, with the University of Münster, in Germany, has published a [News & Views piece](#) in the same journal issue, outlining the history of research into insect metabolism and the work done by the team in this new study.

Prior research has strongly suggested that insects process [oxygen](#) differently than vertebrates—instead of inhaling air, pulling out the oxygen and distributing it via the blood [circulatory system](#), insects have multiple tubes called tracheae all over their bodies that allow oxygen to pass directly to the cells that need it.

But in recent years, some evidence has suggested that the system would not be able to carry enough oxygen to support the insect, especially when exerting itself. In this new effort, the research team suspected that some other mechanism is also involved in capturing oxygen and transporting it to the cells and the organs that need it. To find out, they began an extensive examination of multiple fruit flies.

At one point during their investigation, the researchers found that a certain type of blood cell in mammals is also present in fruit flies—called crystal cells, they are normally used to assist in healing infections. In fruit flies, the researchers found, they are used to transport oxygen.

The team proved this by engineering fruit flies in a way that prevented them from producing crystal cells and then watching how they behaved. All [fruit flies](#) showed signs of hypoxia under normal conditions but improved when placed in a highly oxygenated environment.

Further study showed that the flies partially controlled their respiration by oxygenating Prophenoloxidase 2 proteins and that the crystal cells, in addition to transporting the oxygen, also directed the protein's movements by working with the tracheae.

**More information:** Mingyu Shin et al, *Drosophila* immune cells transport oxygen through PPO2 protein phase transition, *Nature* (2024). [DOI: 10.1038/s41586-024-07583-x](https://doi.org/10.1038/s41586-024-07583-x)

Stefan Lüschnig, Flies use blood cells to take a deep breath, *Nature* (2024). [DOI: 10.1038/d41586-024-01649-6](https://doi.org/10.1038/d41586-024-01649-6)

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