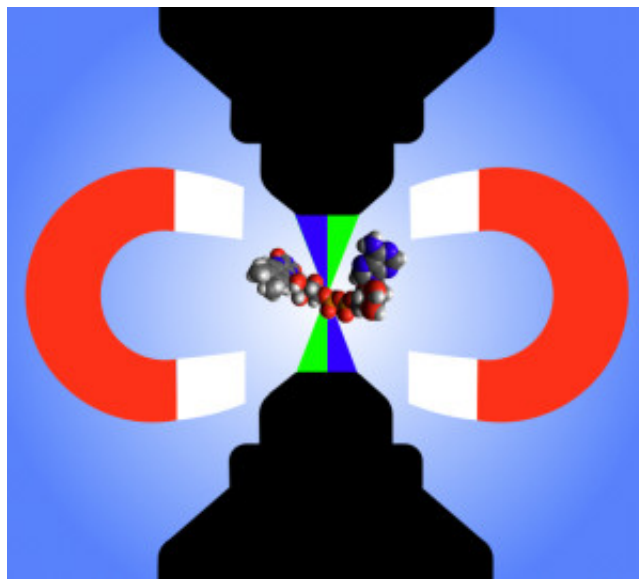


Searching for magnetic sense inside living cells



Some molecules can absorb light and become excited. These excited molecules are often capable of undergoing chemical reactions that unexcited molecules cannot. Nature makes extensive use of these “photochemical reactions” and uses them to achieve some of its most difficult tasks, such as converting sunlight into food (photosynthesis) or repairing damaged DNA. DNA repair is handled by important proteins called photolyases. Animals don’t possess photolyases, but they do possess very similar proteins called cryptochromes that are responsible for handling the body’s clock. Recent work has suggested that cryptochromes may also be responsible for the ability of many animals (e.g. migratory birds, turtles, fruit flies, etc.) to navigate using the earth’s magnetic field. The earth’s magnetic field is extremely weak, so how animals can use it in this way is both surprising and mysterious.

To try to understand whether it is indeed the cryptochromes that are responsible for this amazing ability, scientists at the University of Tokyo have developed a new kind of microscope. This microscope is able to watch photochemical reactions taking place in real time (typically over a period of a few millionths of a second) inside objects of less than one millionth of a meter in size. Not only that, but the microscope can also observe any tiny changes to such reactions in the presence of a magnetic field. This new microscope is now being used to try to watch the photochemical processes of cryptochrome proteins taking place inside the tiny structures within living animal cells, in order to unlock the secrets of animals’ magnetic sense.

Publication

[Optical Absorption and Magnetic Field Effect Based Imaging of Transient Radicals.](#)

Beardmore JP1, Antill LM1, Woodward JR

Angew Chem Int Ed Engl. 2015 Jul 13