Using magnets to control cells: A new breakthrough in modern biomedicine.

The discovery of the magnetically sensitive MagLOV protein enables remote cell manipulation, paving the way for breakthrough biosensors and drugs.

Scientists have successfully discovered and refined magnet-sensitive fluorescent proteins. This discovery ushers in a new era for therapeutic drugs and biosensors that can be switched on and off remotely.

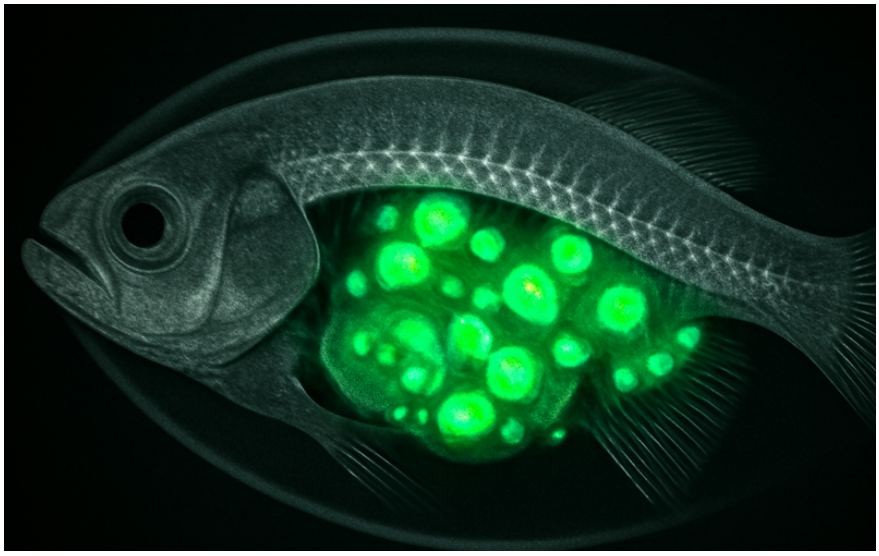
1. Quantum technology within living cells

Green fluorescent proteins (**GFP**) have long been essential tools for observing the inner workings of cells. However, a new study published in the journal *Nature* has taken this technology to the next level: Researchers have successfully engineered **magnetically controlled fluorescent proteins** , allowing them to dim or brighten even when located deep within the bodies of living animals.

The greatest hope now lies in leveraging **magnetic sensitivity** – a quantum physical effect – to develop remotely controlled **biosensors** , or even therapies capable of being precisely activated when needed.

"We wanted to create a 'toolbox' of protein functions that could be remotely controlled using magnetic fields," said **Andrew York** , a physicist at the Chan Zuckerberg Biohub (San Francisco) and co-author of the study.

2. From physical phenomena to practical applications



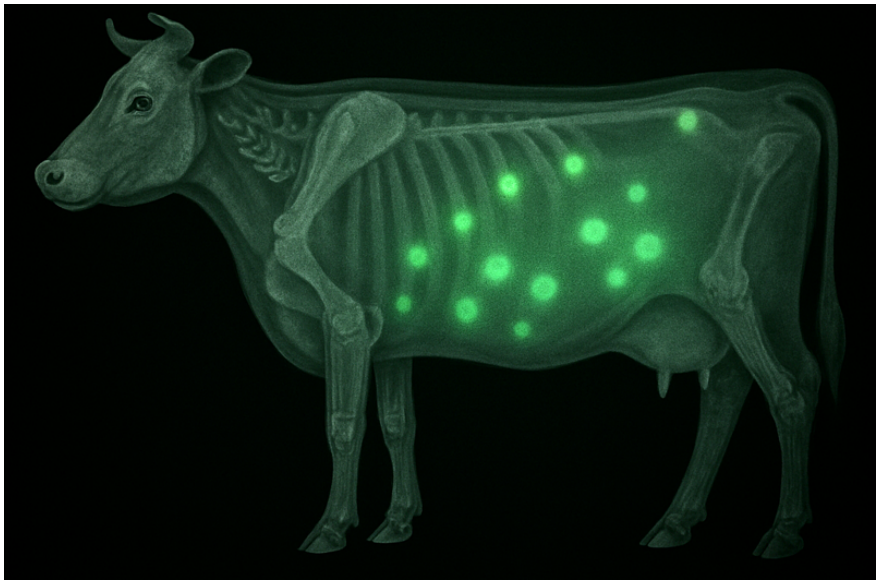
Two years ago, Andrew York and his colleague Maria Ingaramo discovered that GFP would dim when exposed to a weak magnet. However, the initial effect was only about 1%.

To optimize performance, the research team engineered a more sensitive protein called **MagLOV** . The results were impressive: MagLOV's brightness could be reduced by half or more under the influence of a magnetic field.

How MagLOV works:

1. **Magnetic resonance effect:** A magnetic field alters the quantum properties of electron pairs within a protein.
2. **Precise control:** By combining magnetic fields and radio waves, scientists can adjust the fluorescence intensity of *Escherichia coli* bacteria containing MagLOV.

3. Tissue penetration and biochemical mapping



A research team at the University of Oxford, led by Gabriel Abrahams and Harrison Steel, tested the ability to locate bacterial cells containing MagLOV deep within silicon blocks.

Because magnetic fields can easily penetrate body tissues and MagLOV is encoded by genes, this technology promises to:

1. **Remotely monitor molecular processes** without invasive intervention.
2. **Mapping the cells** inside the body of a living animal.
3. **Control the activity of drugs** at specific locations in the body using external magnets.

The discovery of the MagLOV protein is not merely a bioengineering achievement, but also proof that humanity is gradually mastering the most complex laws of the quantum world for the benefit of medicine.

While there's still a long way to go from the lab to clinical application, the prospect of non-invasive treatments for cancer and other serious illnesses, where doctors can manipulate medication using magnetic fields from outside the body, is becoming closer than ever. This truly marks a new era of 'precision medicine' – where fluorescent light and magnetic power work together to illuminate the deepest mysteries within living cells.