



**WE BUILD TEAMS THAT WIN
IN LOUISIANA FOR THE WORLD**

**LSU is turning
fundamental research
on iron balance into
new ways to fight
infection and protect
our environment.**



You need iron to fight off infections, repair your DNA, and produce cellular fuel.

Since the dawn of time, life has been battling over a singularly important and often overlooked resource: iron. All living things need iron to survive. Bacteria are particularly iron-greedy and will steal iron from hosts, including humans.

However, too much iron is toxic: **Balance is key.**

LSU researchers are working to understand just how important iron is for us and the bacteria we live with, and how interfering with iron balance in bacteria can be a target for new antibiotics.

\$232K

from NSF

**How do cells
sense and
control their
iron levels?**

Huangen Ding, LSU
Biological Sciences

\$3.7M

from NIH

**Can we target
bacteria's iron
balance to
discover new
antibiotics?**

Mario Rivera, LSU
Chemistry

\$27M

NIEHS Superfund

**What are the
impacts of
pollutants like
iron oxides?**

LSU AgCenter and
LSU Superfund
Research Center

Want to collaborate? Get in touch.



Huangen Ding's lab studies how bacteria regulate their uptake and storage of iron. The lab also studies how issues with iron balance in human cells can lead to diseases like cancer.

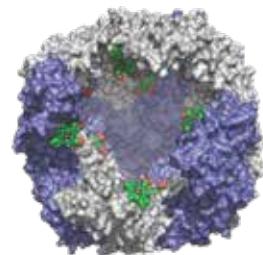
Ding and Marcia Newcomer were the first to crystallize IscA in *E. coli*, a protein critical for the assembly of iron-sulfur clusters that control iron balance. Ding's work changed our understanding of how bacteria sense and regulate iron levels.

DOIs: [10.1021/bi035440s](https://doi.org/10.1021/bi035440s), [10.1016/j.jbc.2003.104748](https://doi.org/10.1016/j.jbc.2003.104748)



Mario Rivera's lab has identified bacterial proteins that carry and store iron. The researchers are now looking at ways to trick this machinery into thinking no iron is available, triggering alarm bells that lead to lethal stress inside bacteria.

DOI: [10.1016/j.jinorgbio.2023.112306](https://doi.org/10.1016/j.jinorgbio.2023.112306)



Bacterioferritin (BfrB) from *Pseudomonas aeruginosa* bacteria. This spherical and hollow protein can store up to 3000 Fe³⁺ (iron) ions in its interior cavity.

Bacteria are genius adapters — if you take a single type of antibiotic for an infection, any bacteria that survive can learn and teach others how to survive that drug in the future.

To fight bacteria resistant to existing antibiotics, researchers must work to discover new targets in bacteria that can be used to develop novel types of antibiotics.



Jong Ham at the LSU AgCenter is investigating ways to boost plant iron uptake and fight infections. Beneficial soil microbes good at capturing iron may boost plant iron uptake and crop yields.

DOI: [10.1101/2024.01.10.575074](https://doi.org/10.1101/2024.01.10.575074)



LSU's Superfund Research Center studies harmful environmentally persistent free radicals. They are looking at how iron and other metal oxides (like rust) add to the creation of free radicals.

DOI: [10.1021/acs.est.7b04439](https://doi.org/10.1021/acs.est.7b04439)