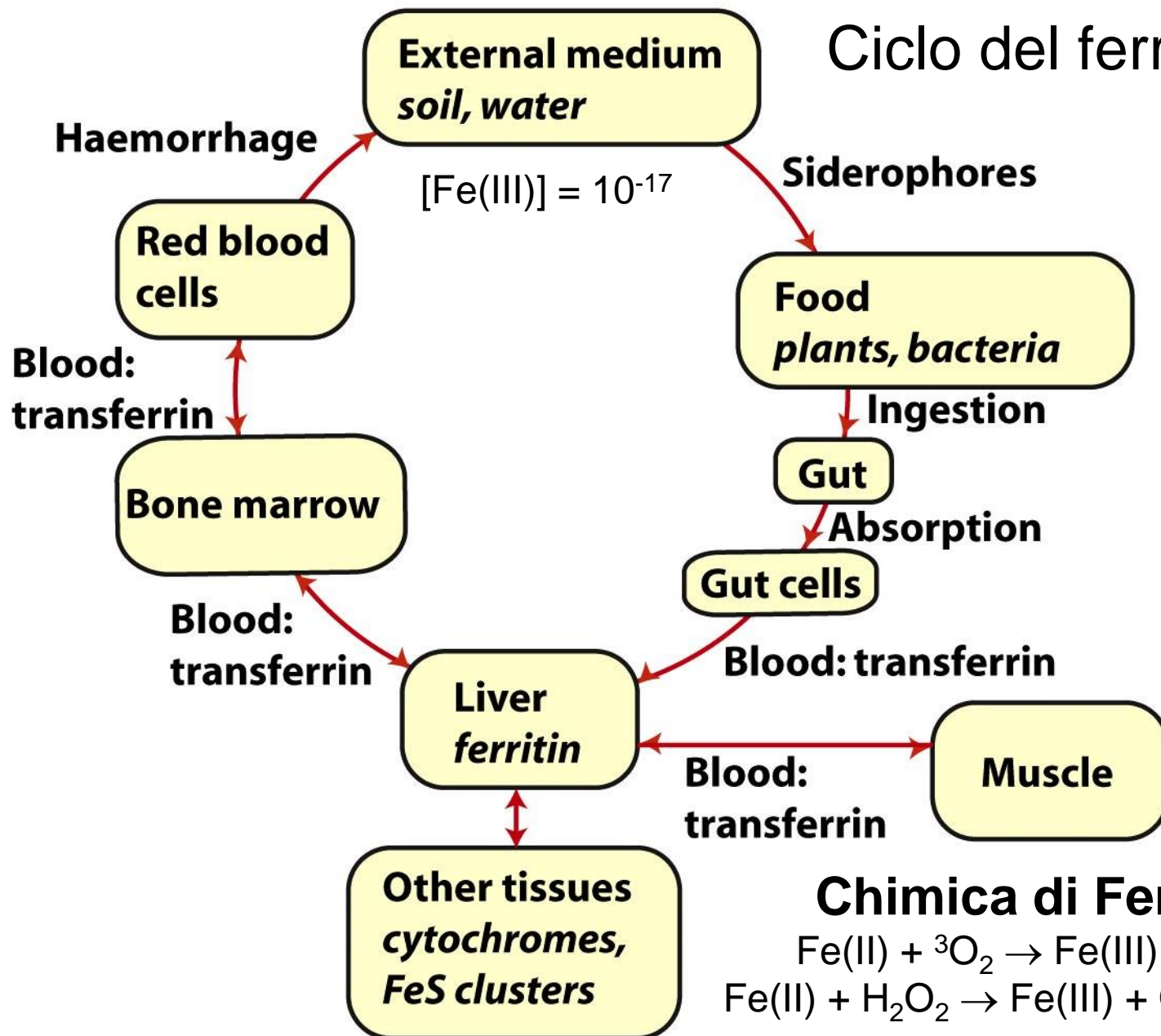
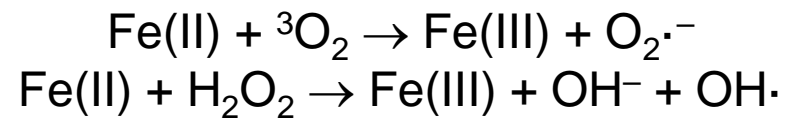


Microtomografia di fluorescenza ai raggi X

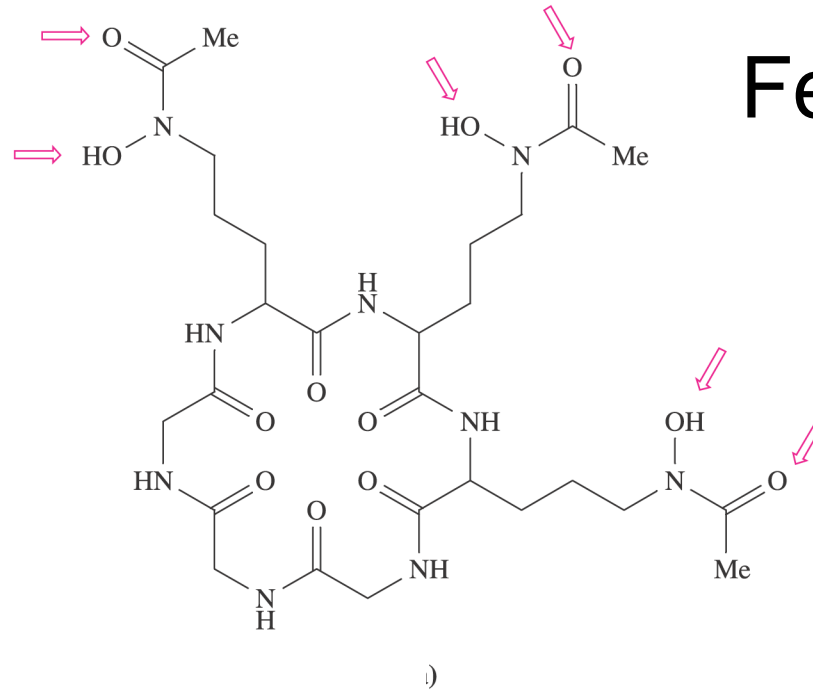
# Ciclo del ferro



## Chimica di Fenton



Siderofori  
Idrossammati  
(funghi, lievito)

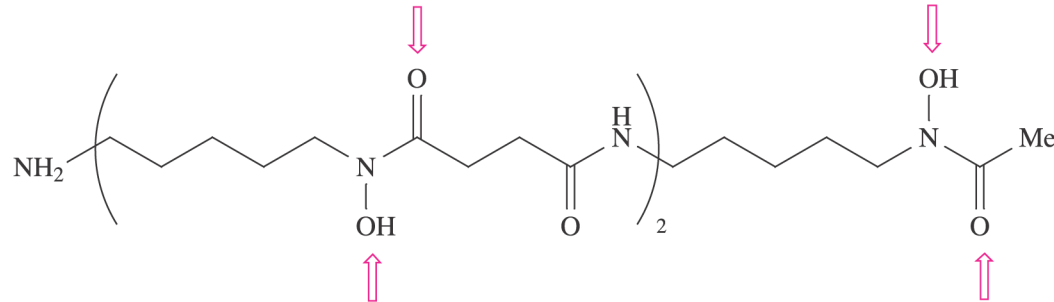


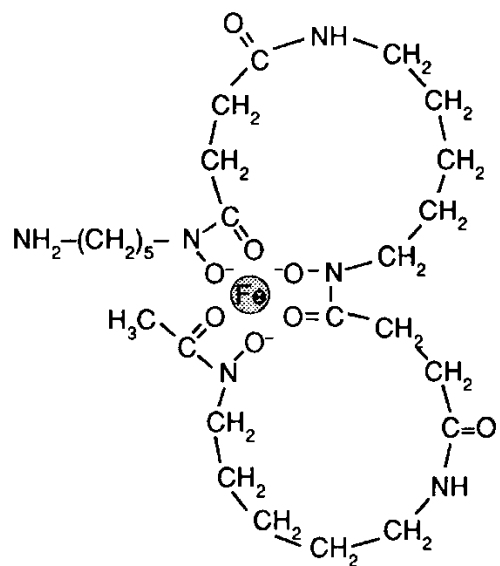
Fe(III) alto spiro

desferricromo

d)

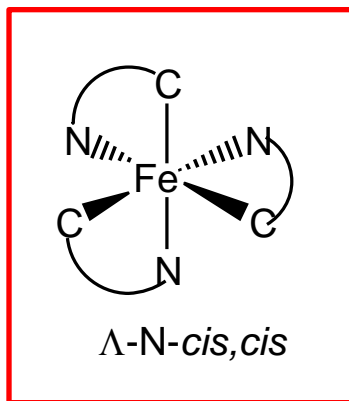
desferriossamina



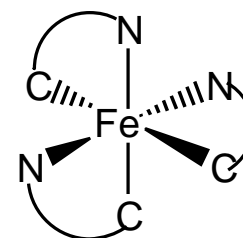


ferrioxamine B

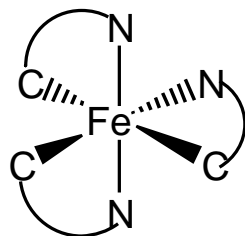
without Fe: deferrioxamine B



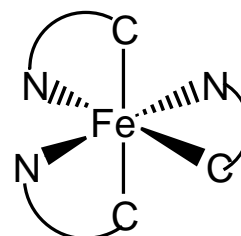
$\Lambda$ -N-*cis,cis*



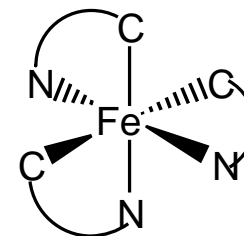
$\Lambda$ -C-*trans,cis*



$\Lambda$ -N-*trans,cis*

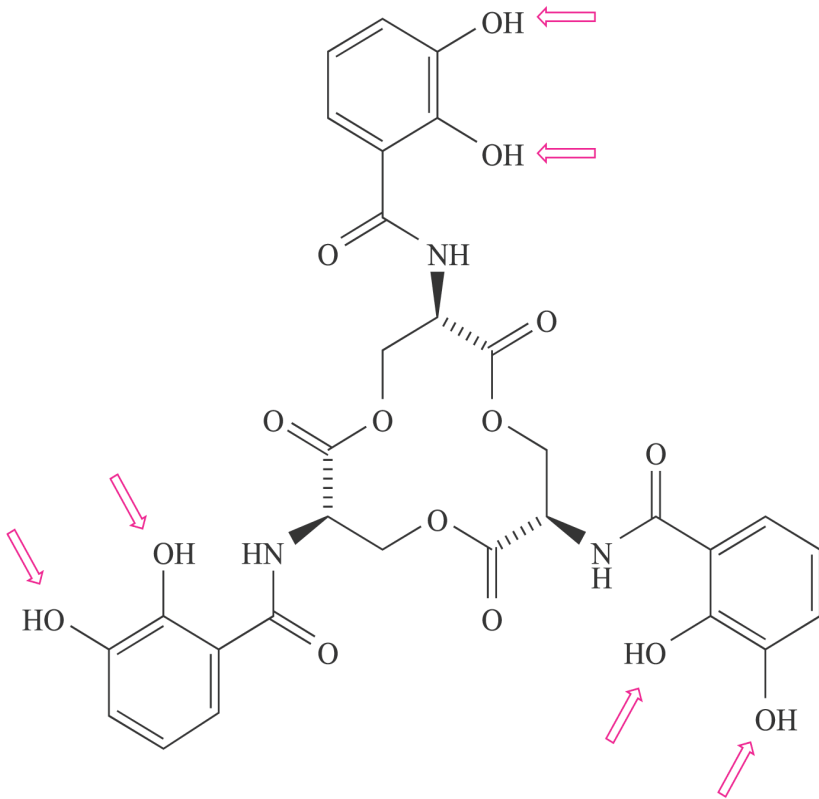


$\Lambda$ -C-*cis,trans*



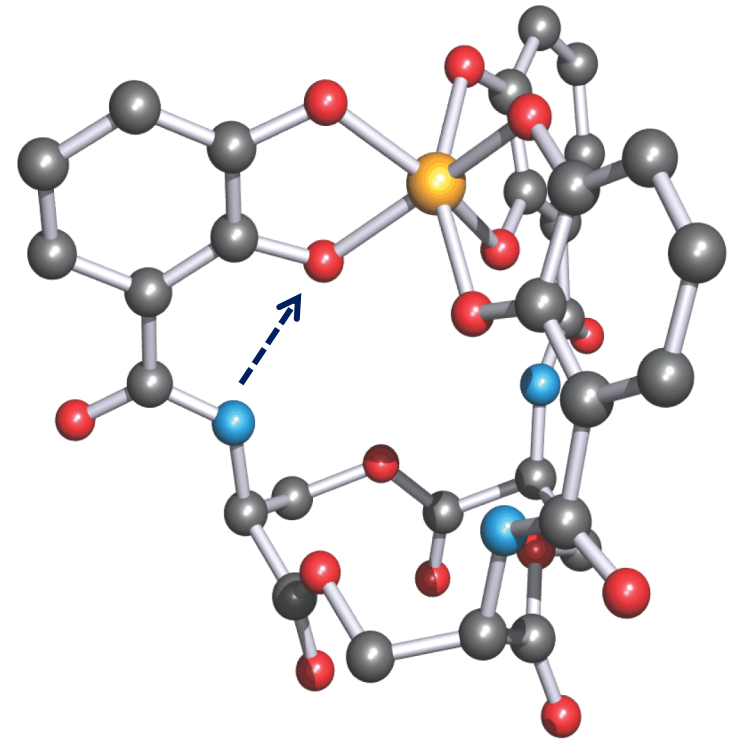
$\Lambda$ -N-*trans,cis*

# Siderofori catecolati (batteri)



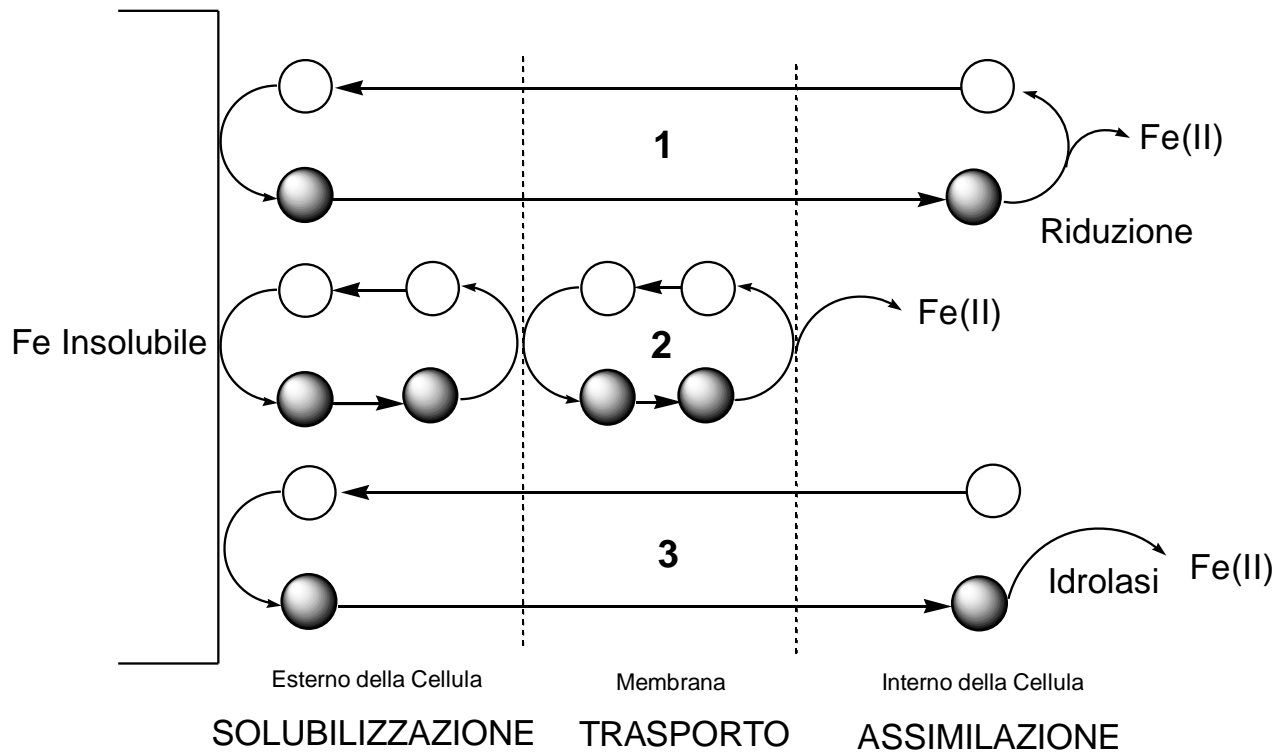
Enterobactina

Fe(III) alto spin



Complesso V(IV)-enterobactina

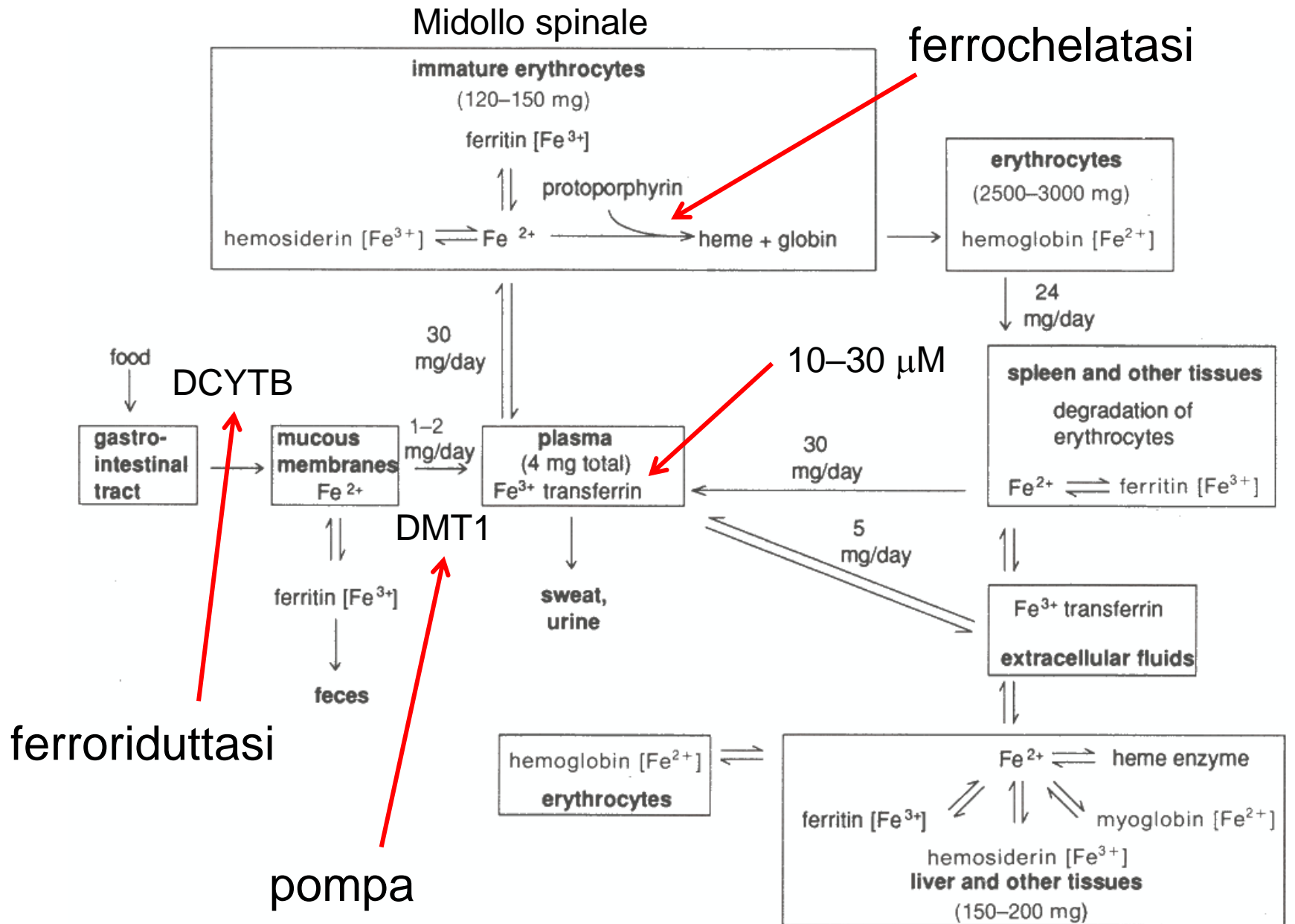


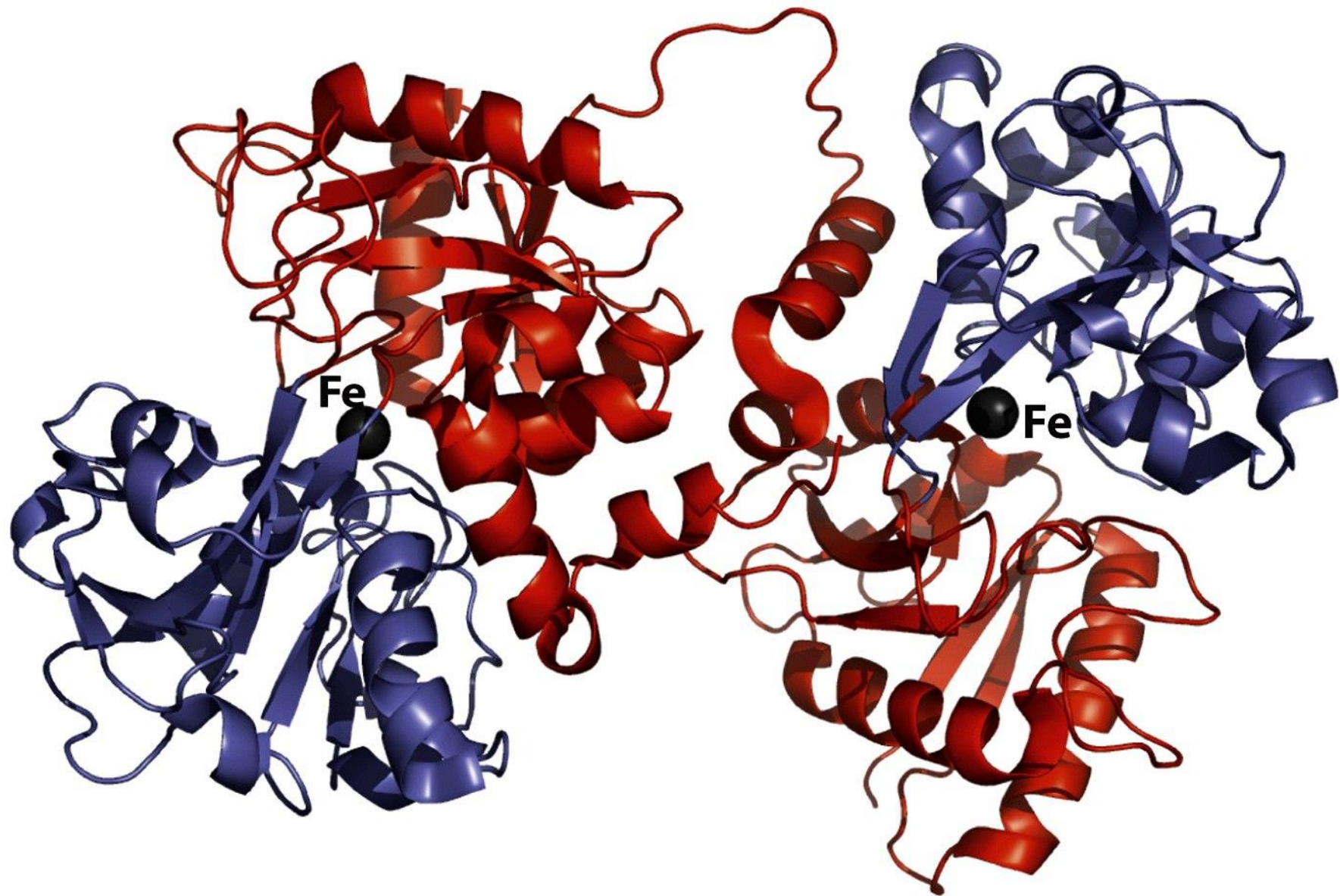


ferricrome

desferriossamina

enterobactina



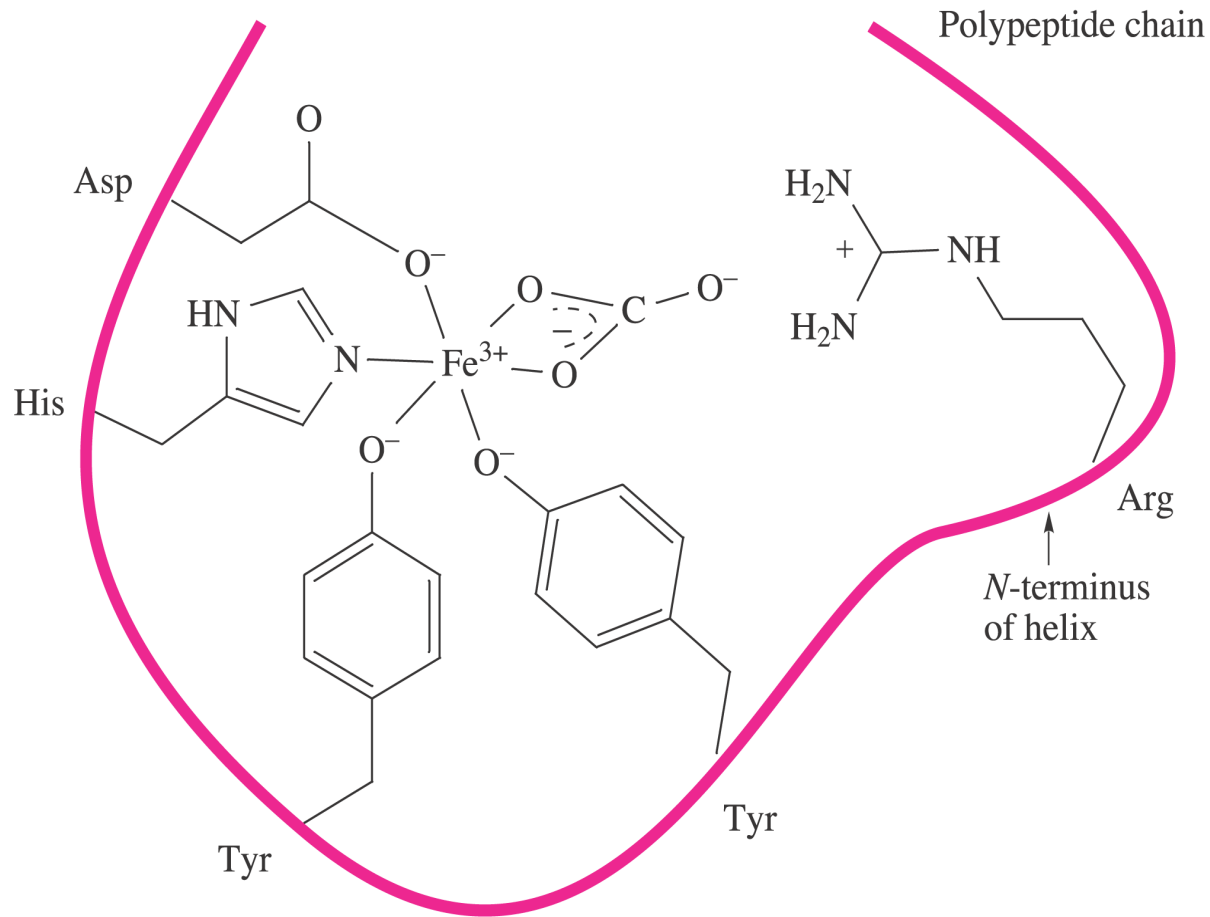


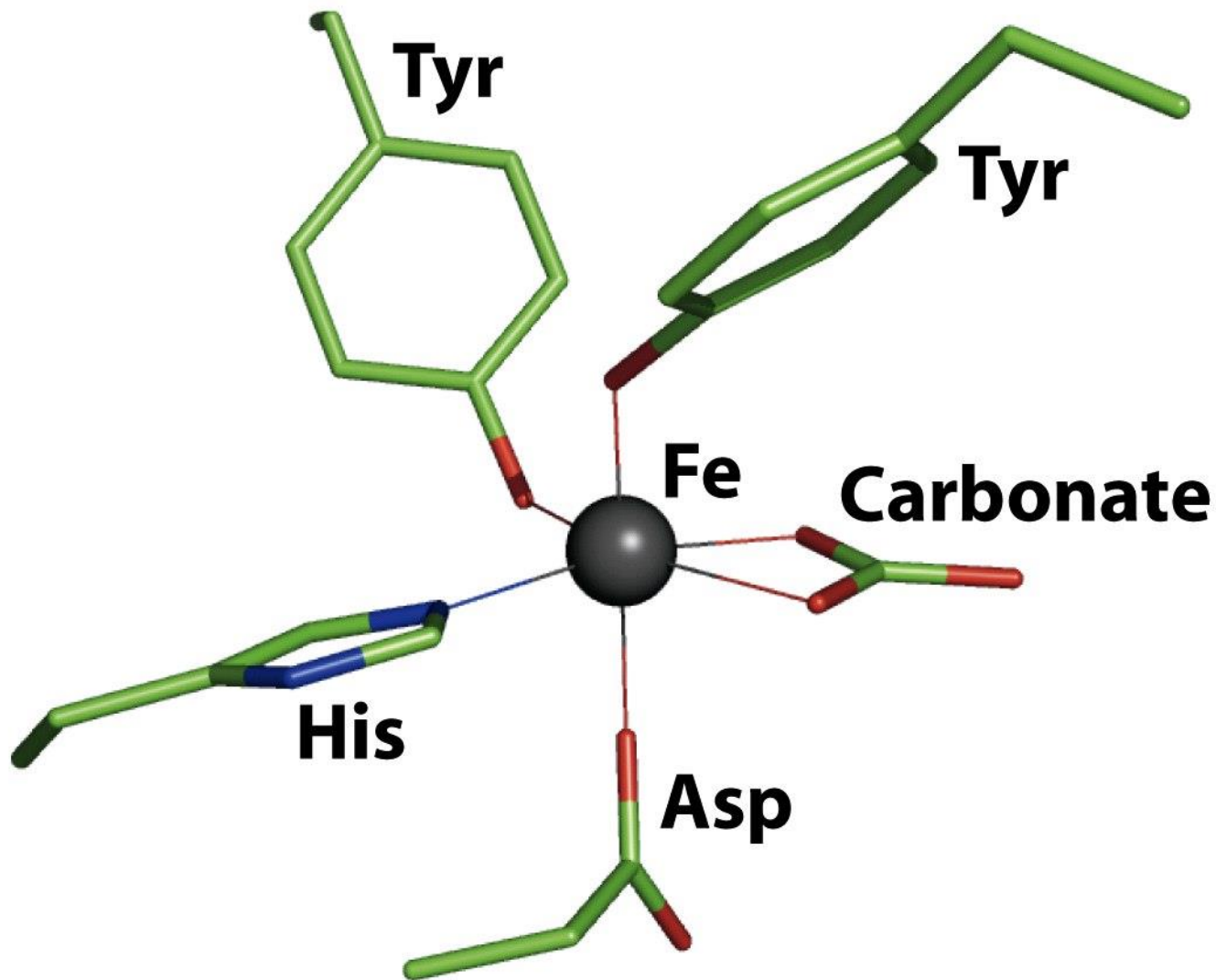
Transferrina

80 kDa



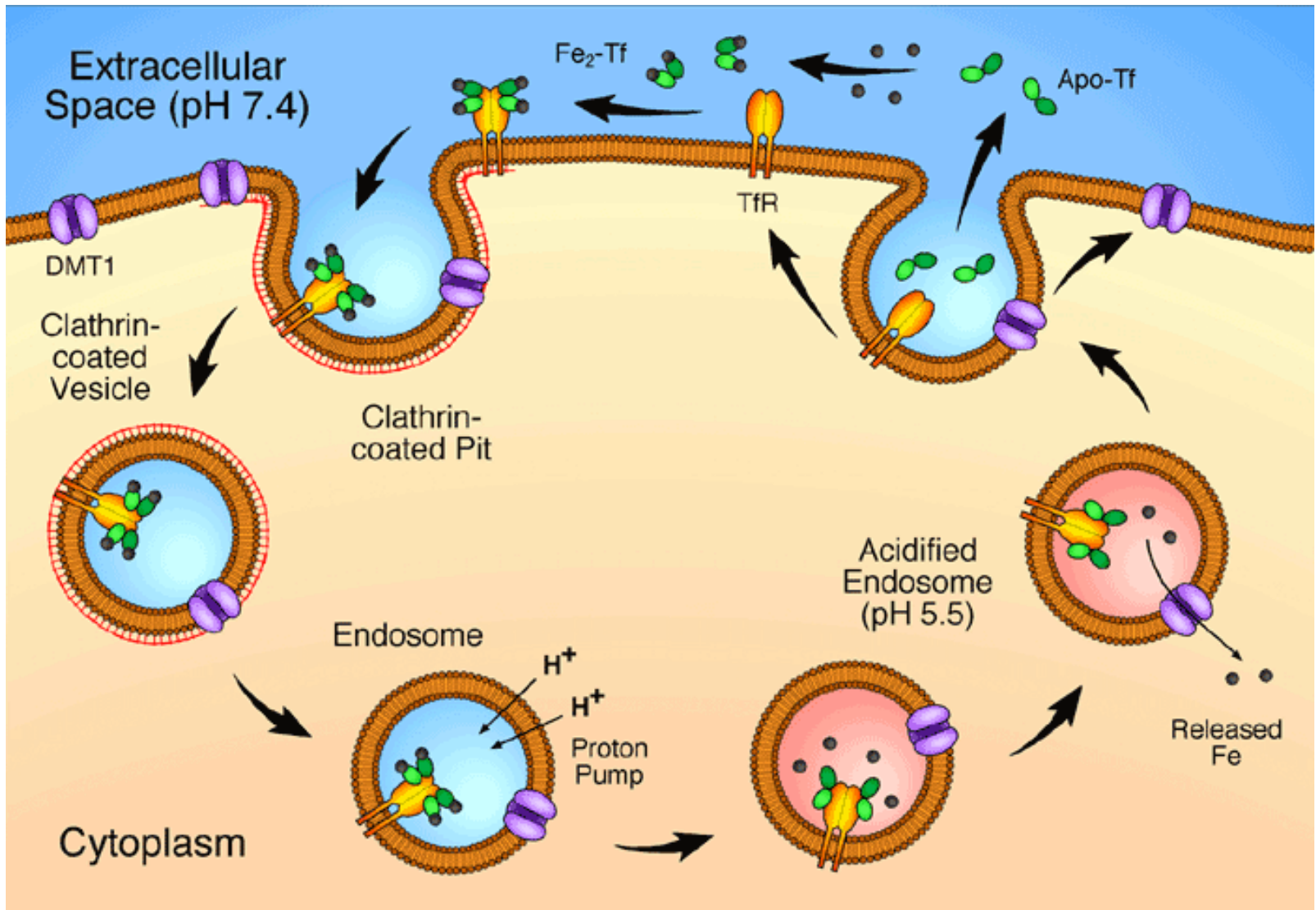
# Sito di coordinazione del Fe nella transferrina



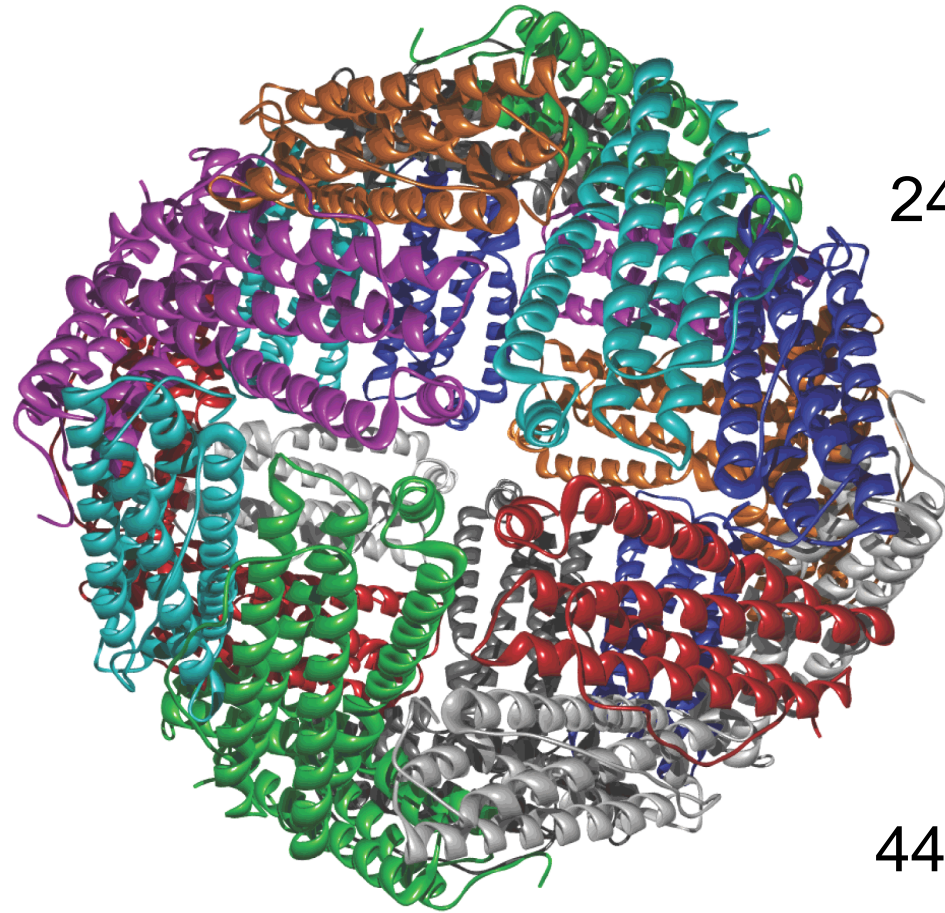
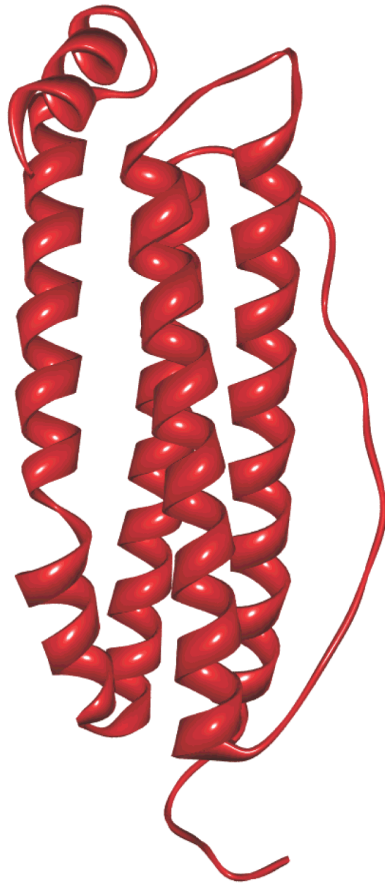


Sito di coordinazione del Fe nella transferrina

# Ciclo della transferrina



# Ferritina



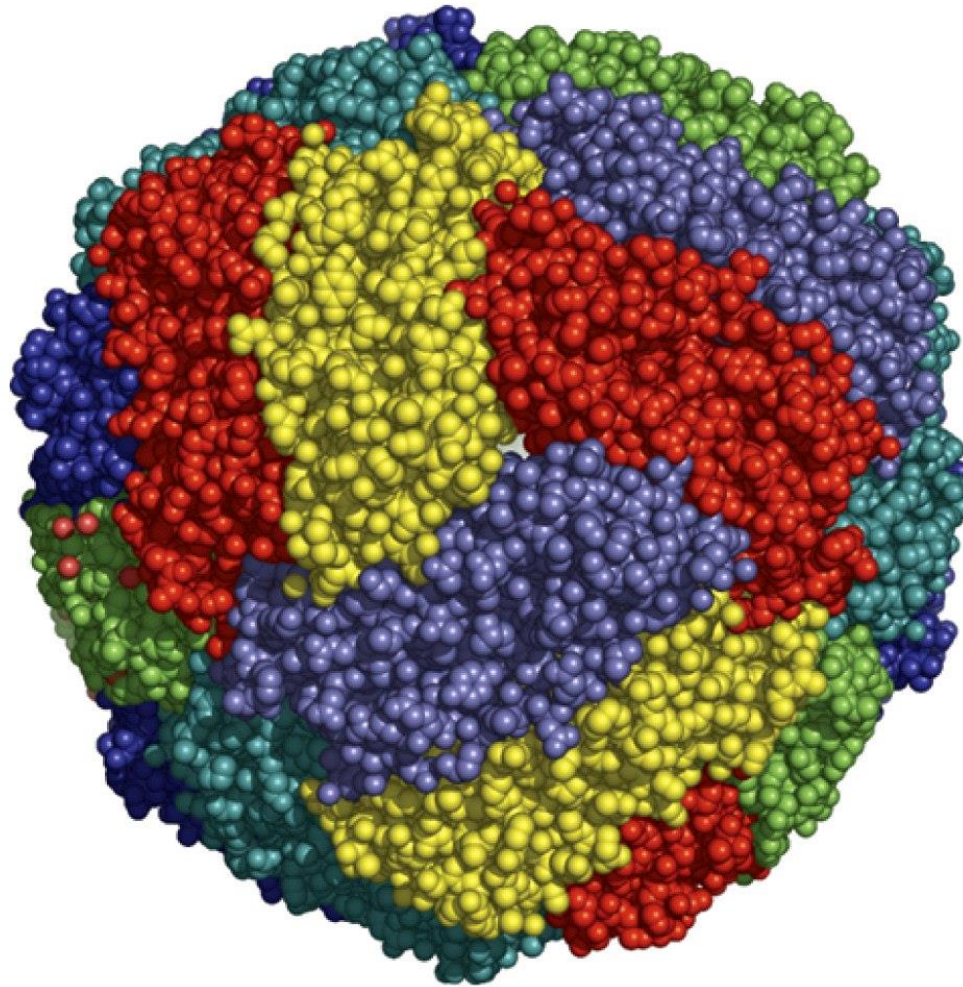
24 unità

440 kDa

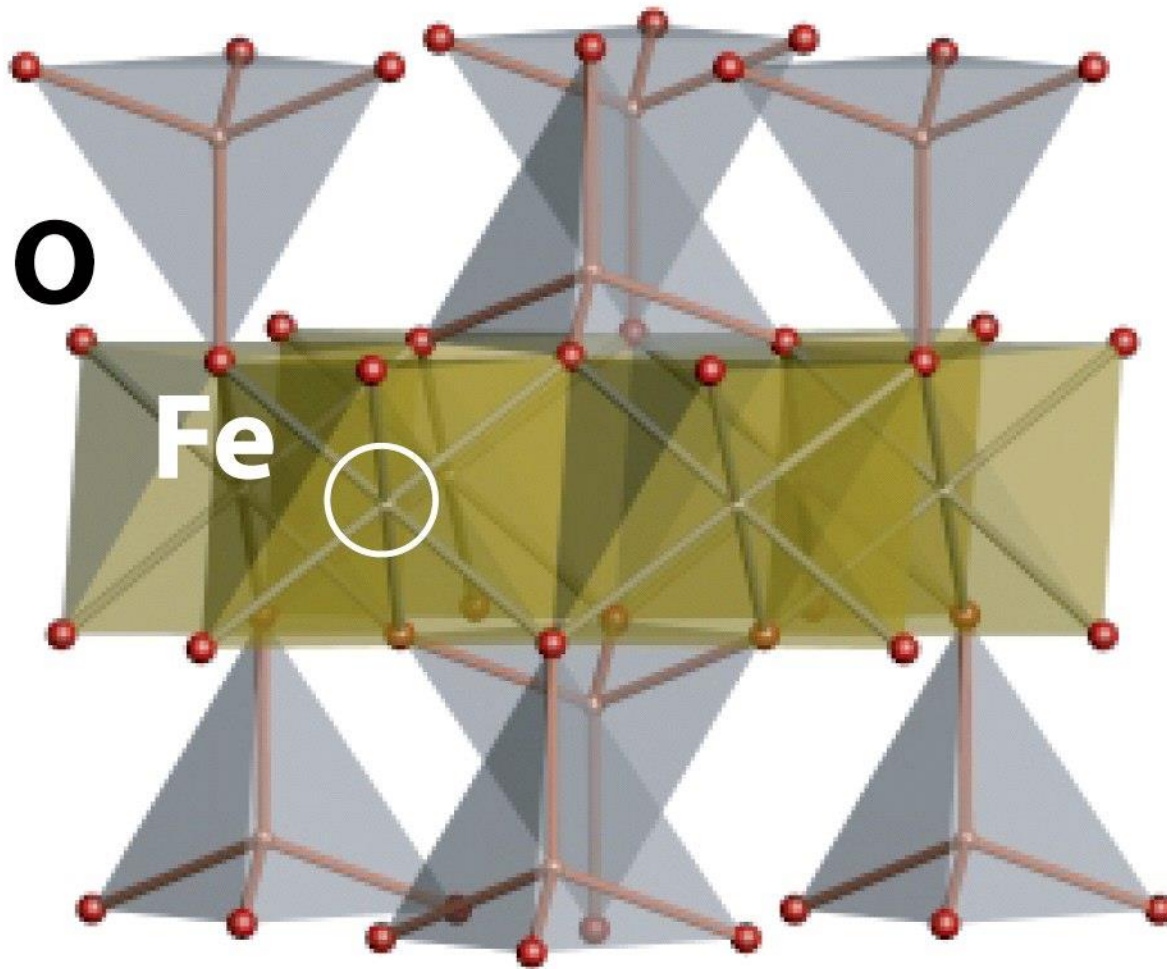
8 pori idrofilici con simmetria ternaria (*Fe in*)

6 pori idrofobici con simmetria quaternaria (*Fe out*)

In, 7.5nm

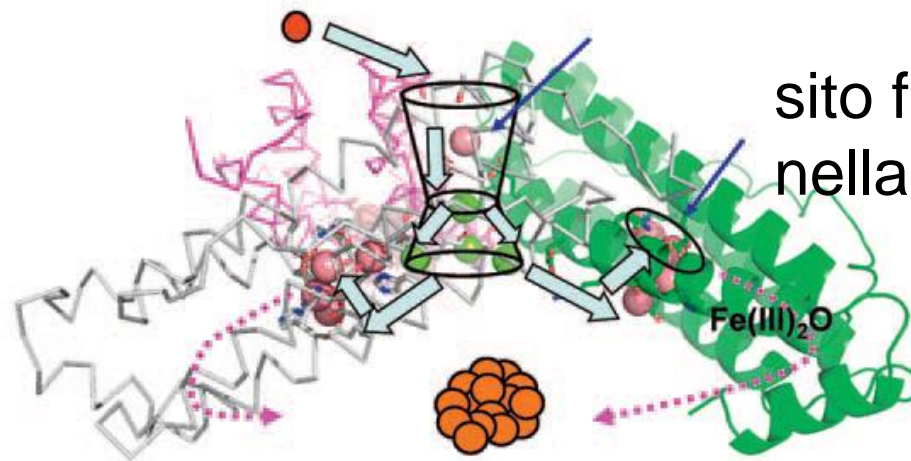
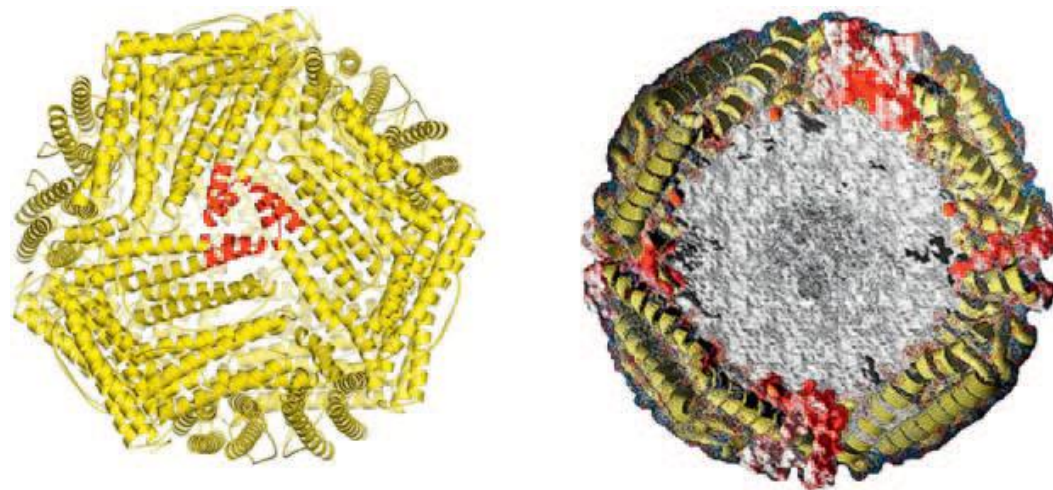


Out, 12 nm



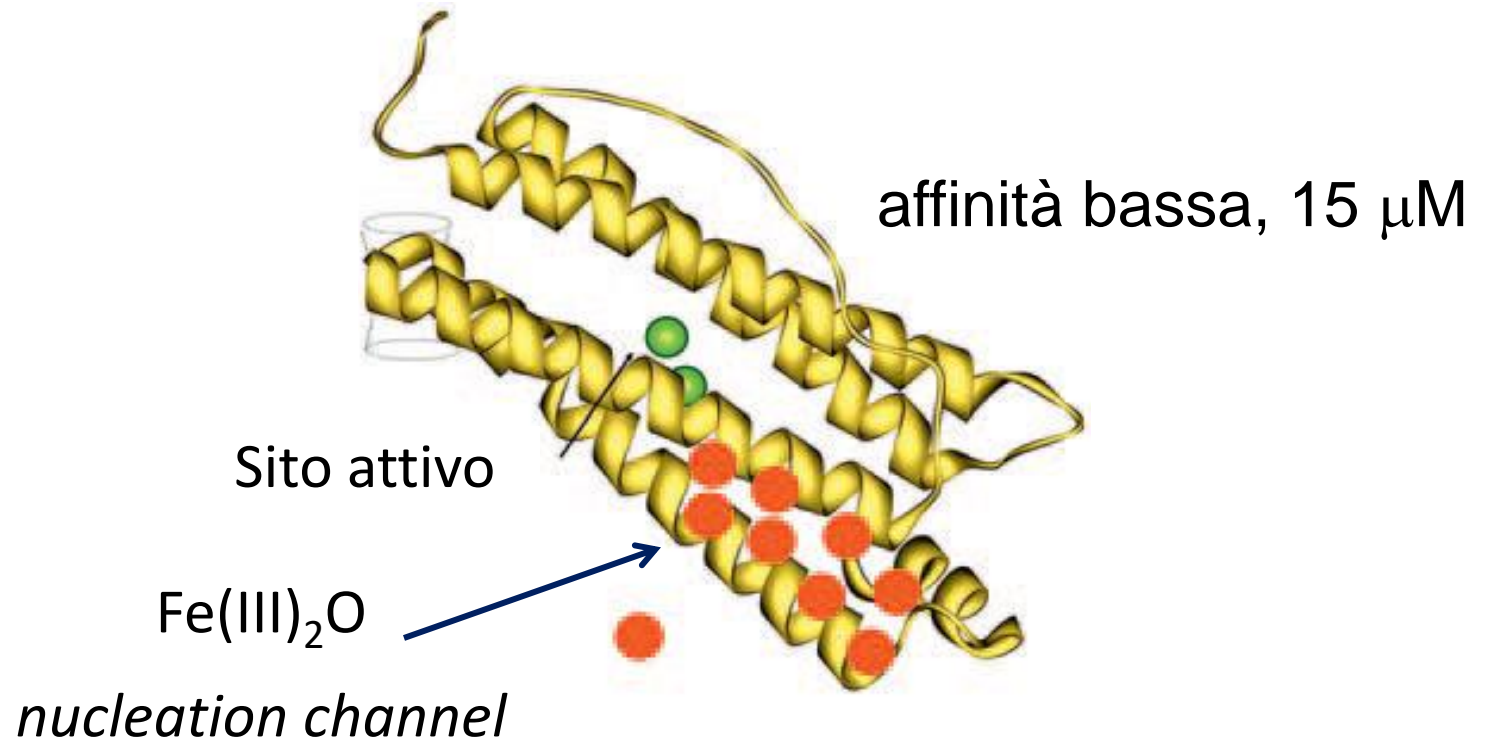
# Ferrihydrite

Fino a 4500 atomi di Fe



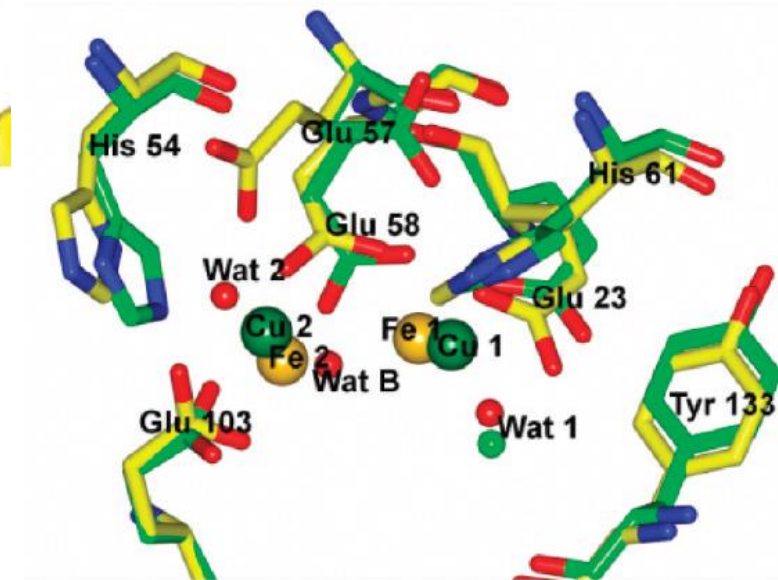
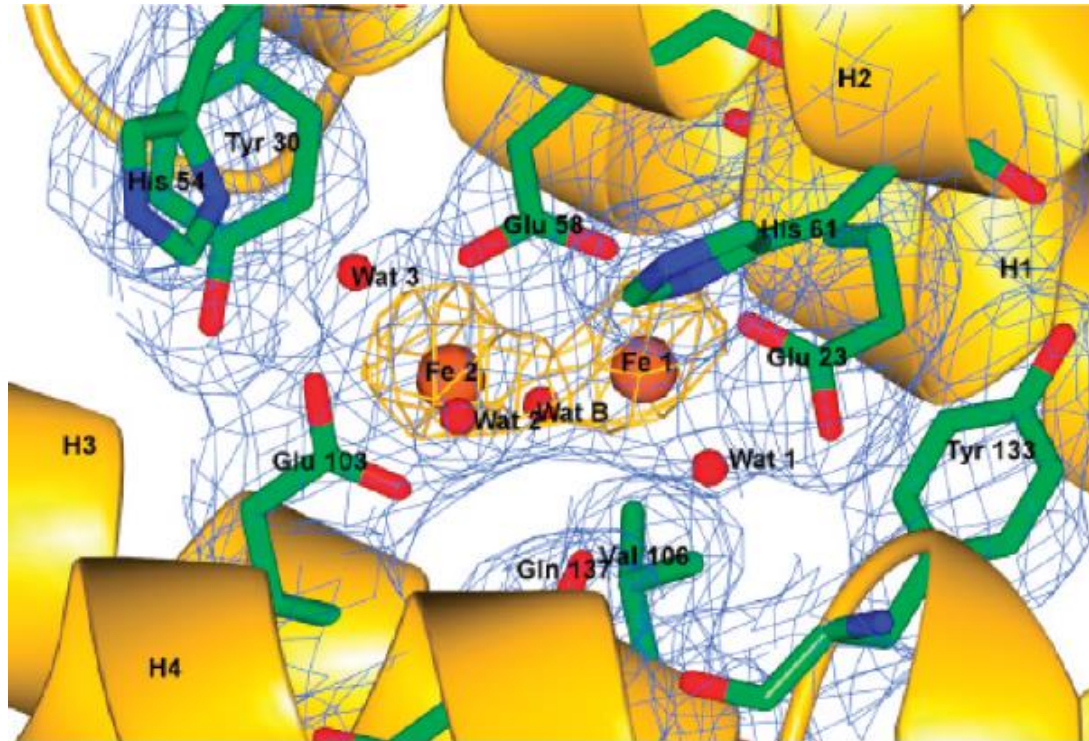
sito ferrossidasico  
nella *H*-ferritina

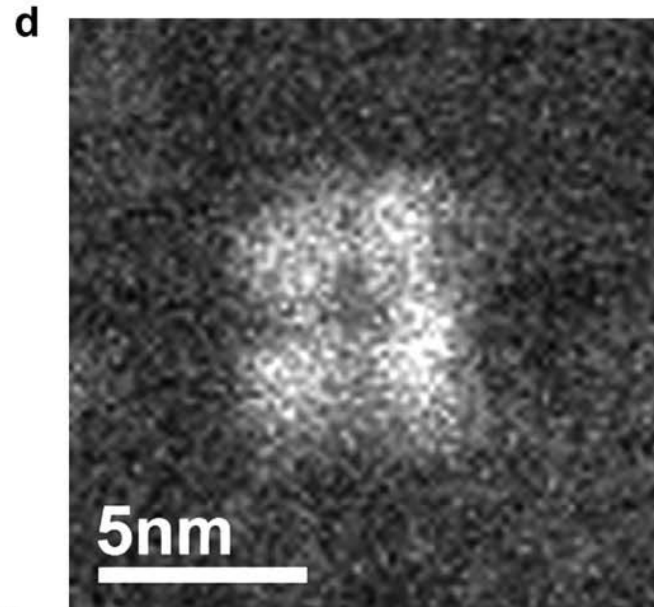
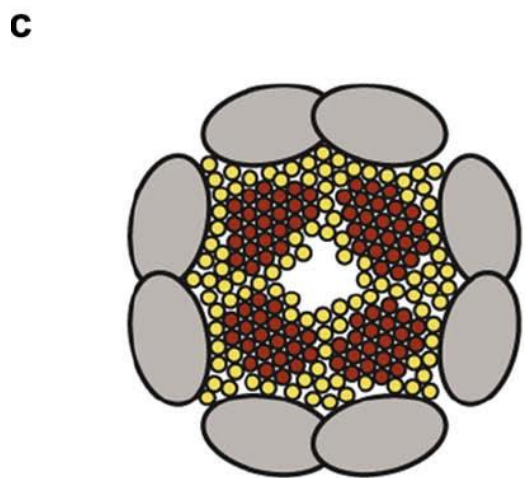
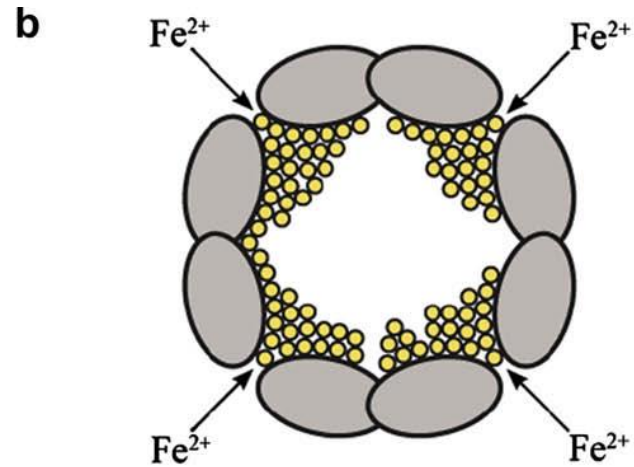
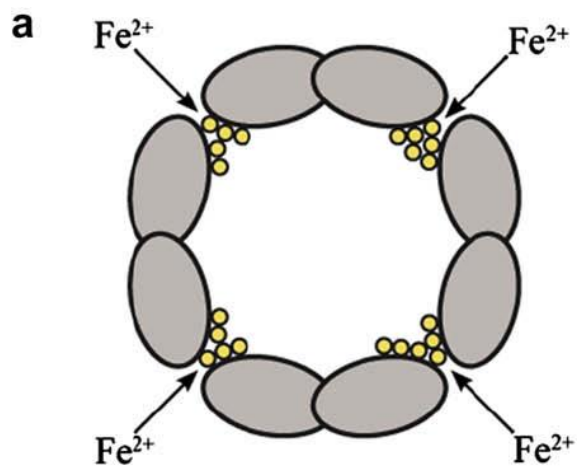
# sito ferrossidasico








# Struttura ai raggi X di un sito ferrossidasico

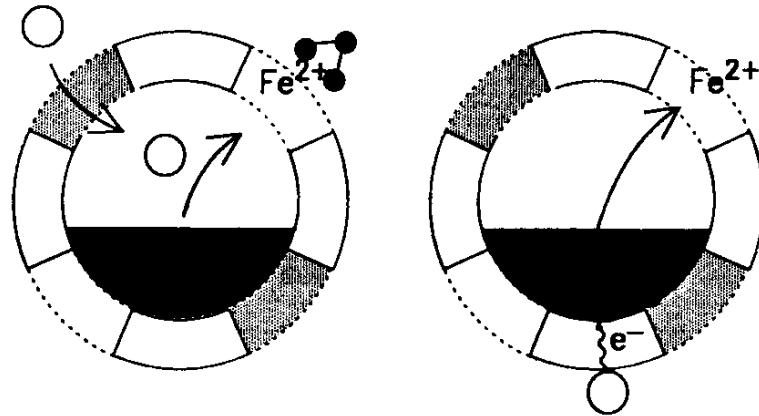




Imagine  
TEM

-   $\text{Fe}^{3+}$  coordinated to O and OH
-   $\text{Fe}^{3+}$  in ferrihydrite crystal structure
-  Protein shell sub-unit

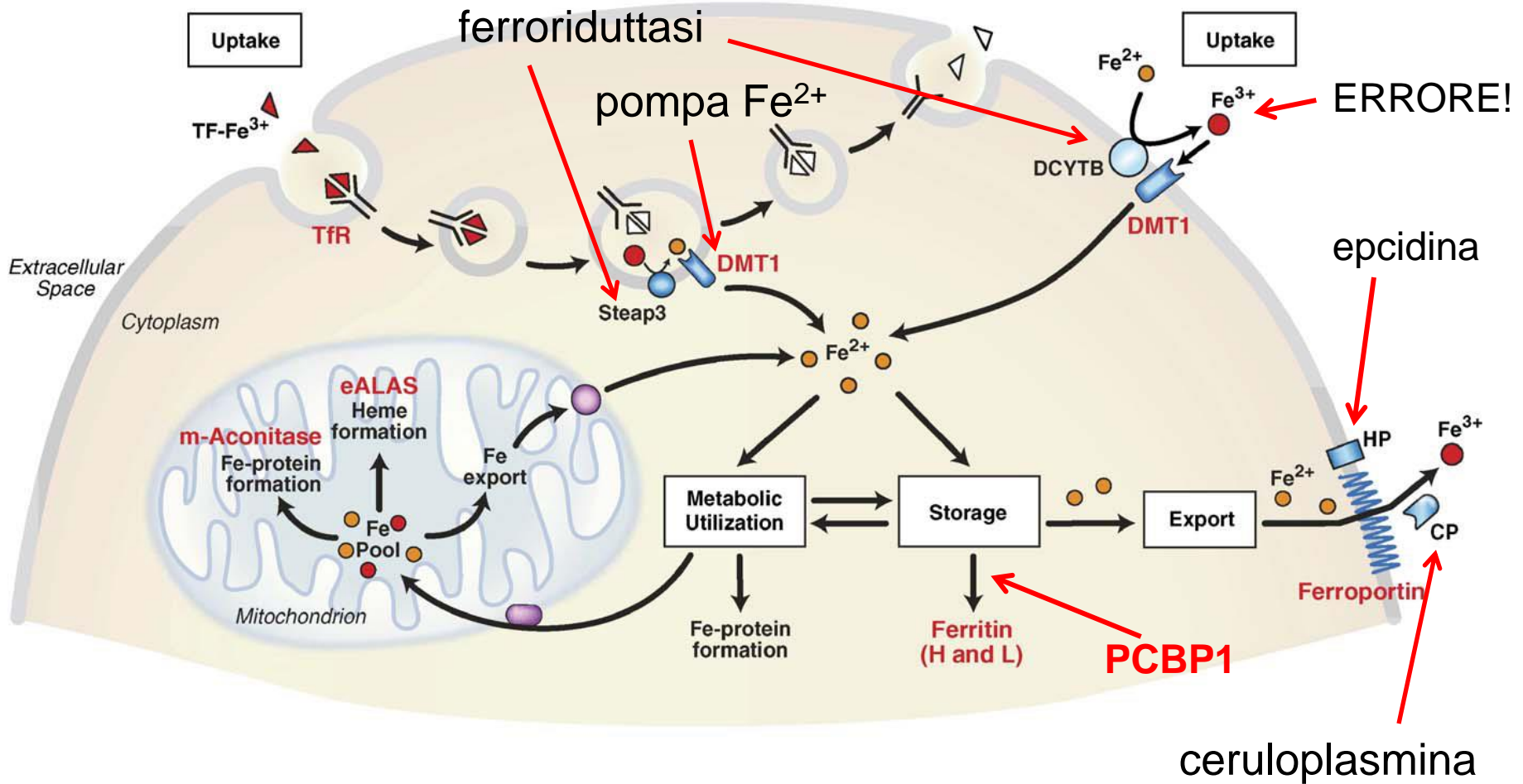
# Rilascio del ferro



○ : reductant

Y : chelating agent

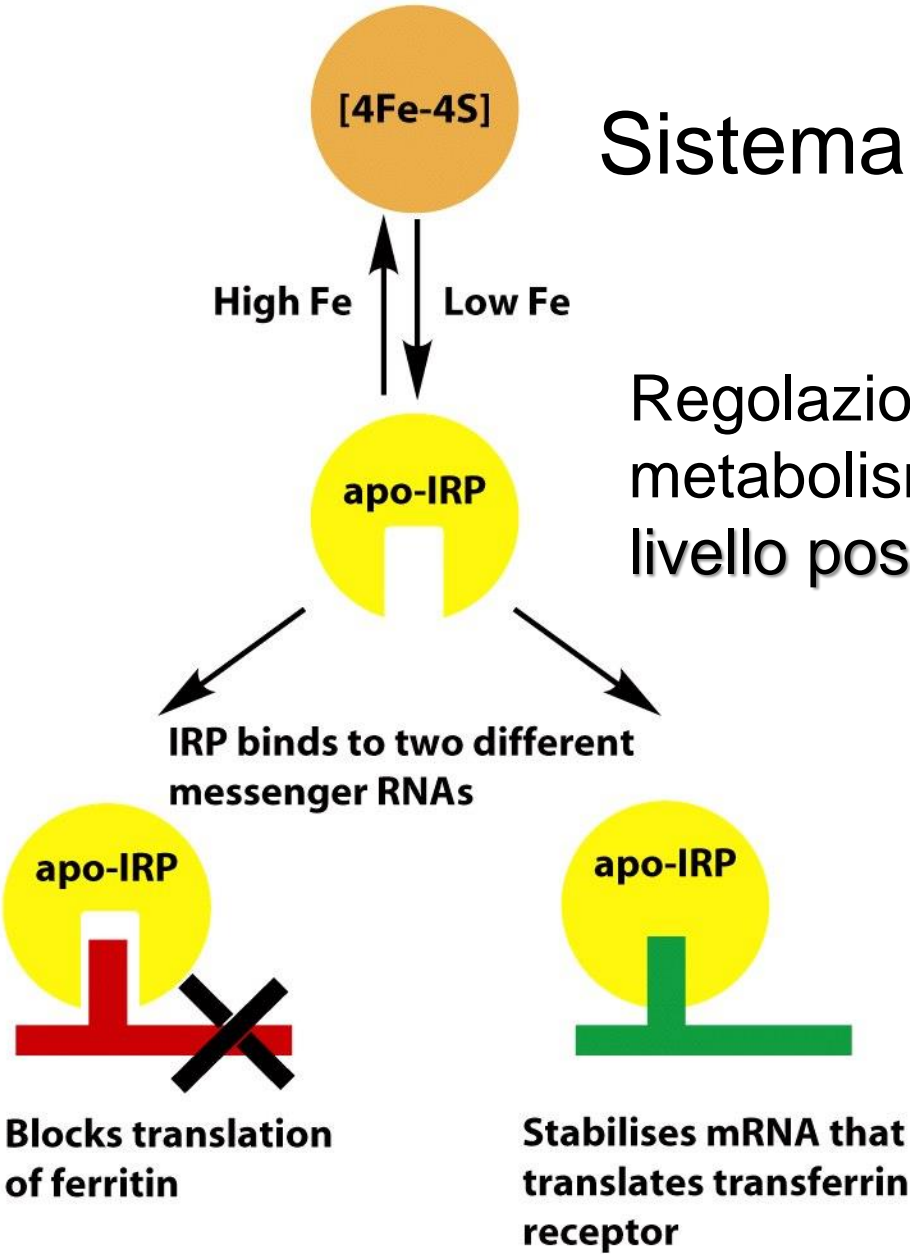
# Omeostasi del ferro – Sistema IRP/IRE



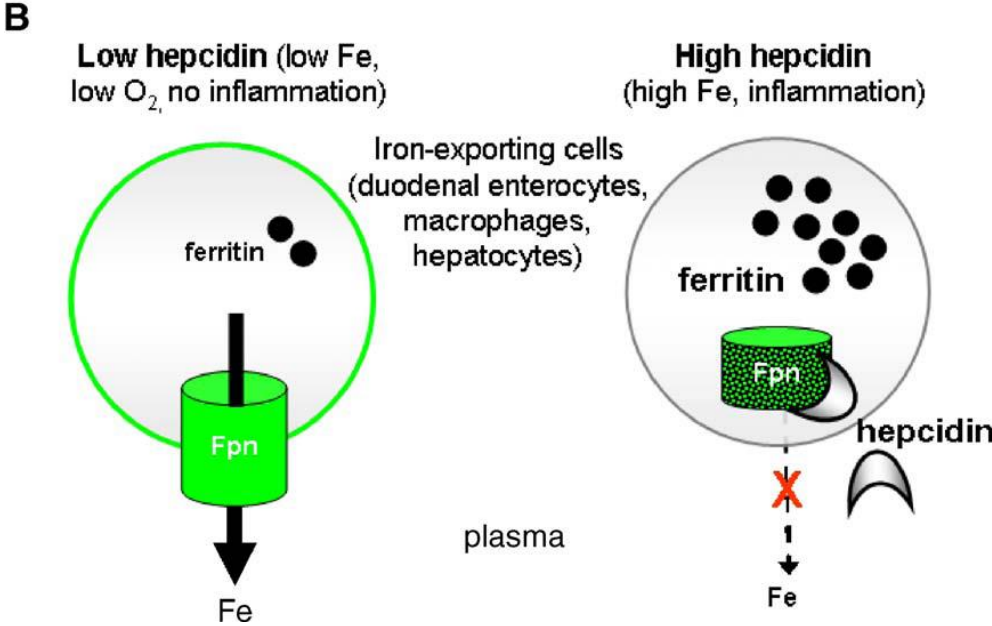
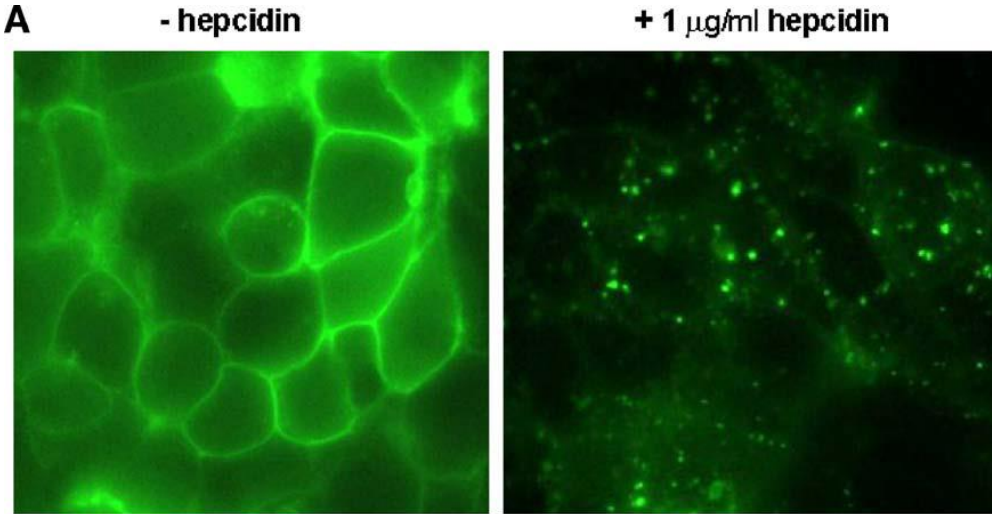
IRP: Iron Regulatory Proteins

IRE: Iron Responsive Elements (mRNA)

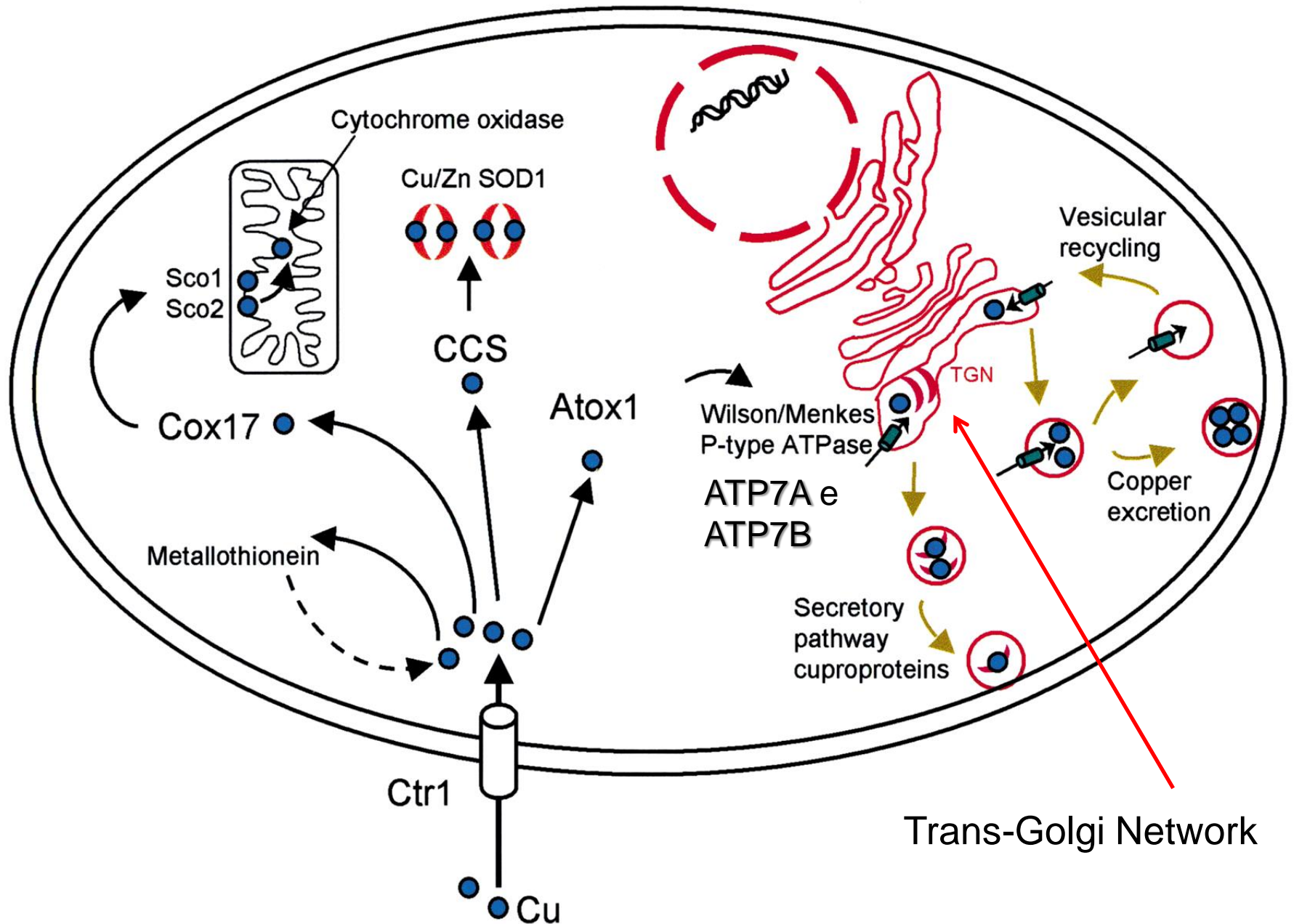
# Sistema IRP/IRE

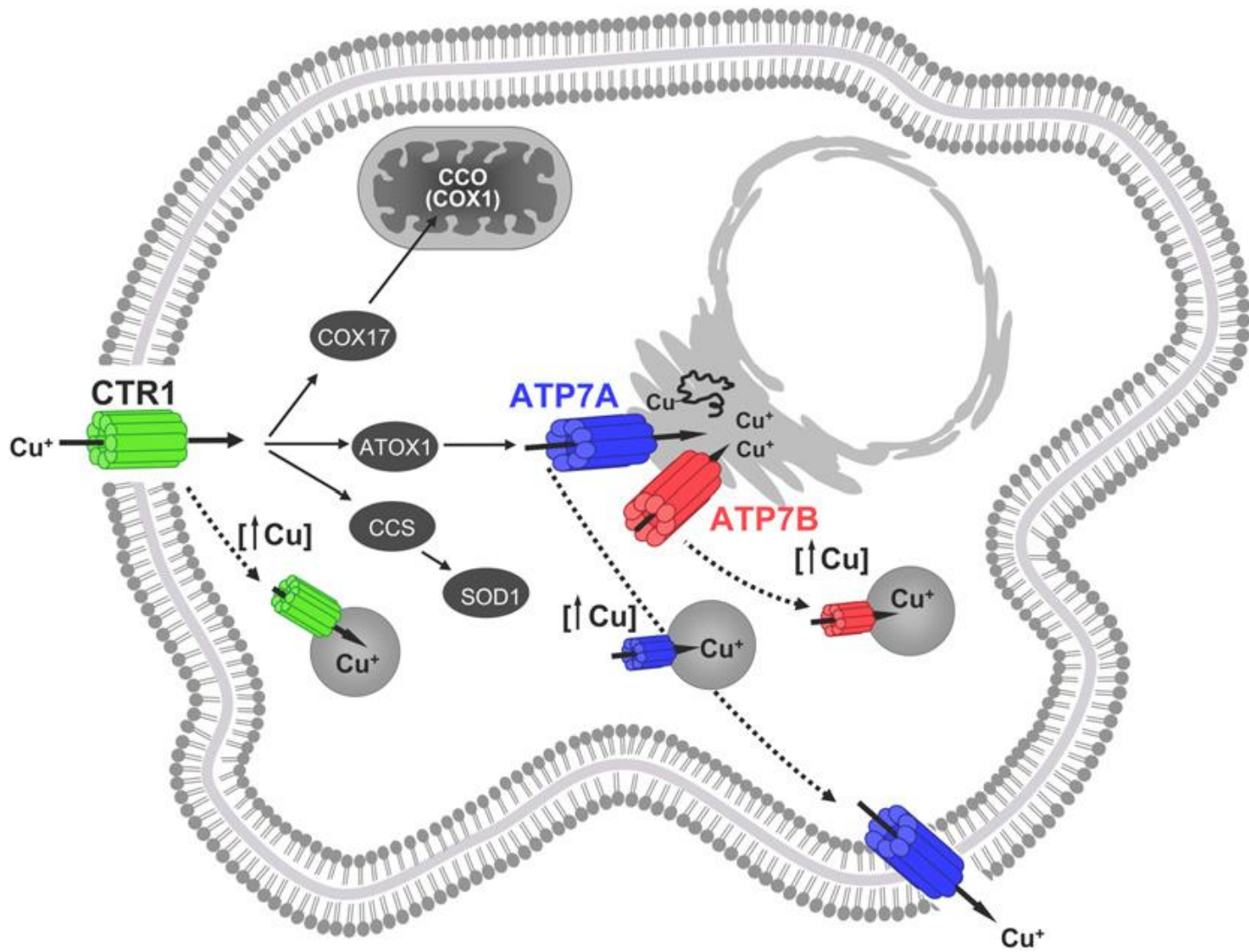


# Export del ferro nel plasma regolato da epcidina

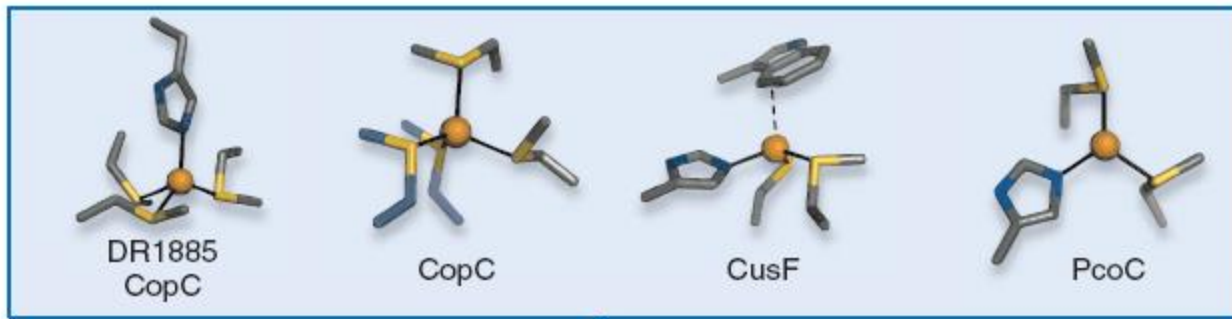


# Omeostasi del rame



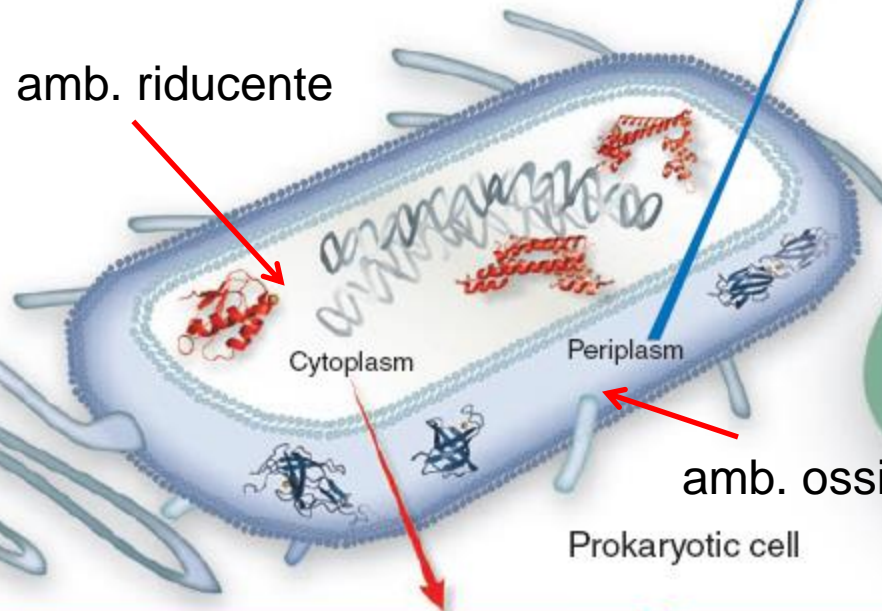






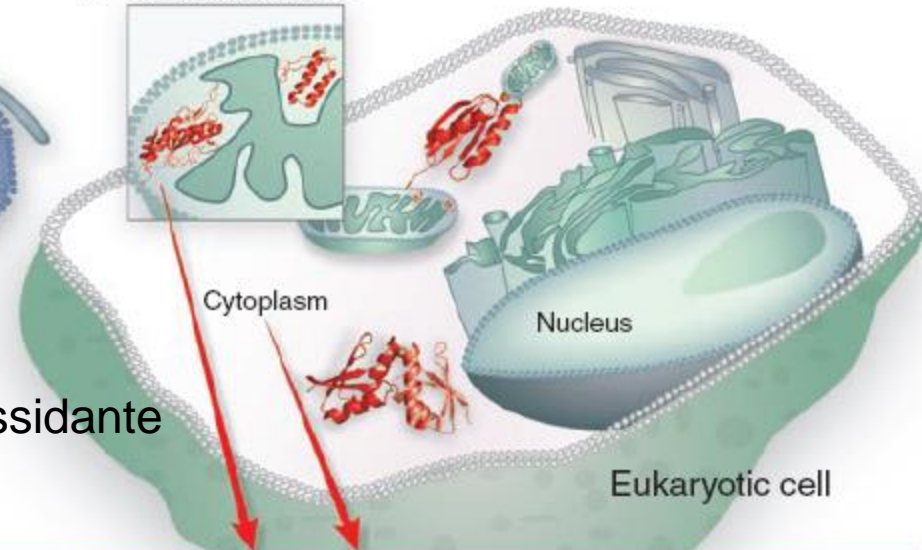
a

amb. riducente



b

Detail, mitochondrion



CopZ  
CueR



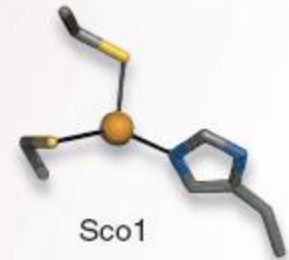
CsoR



Atx1, Hah1  
Ccc2, Mnk, Wnd  
Cox17

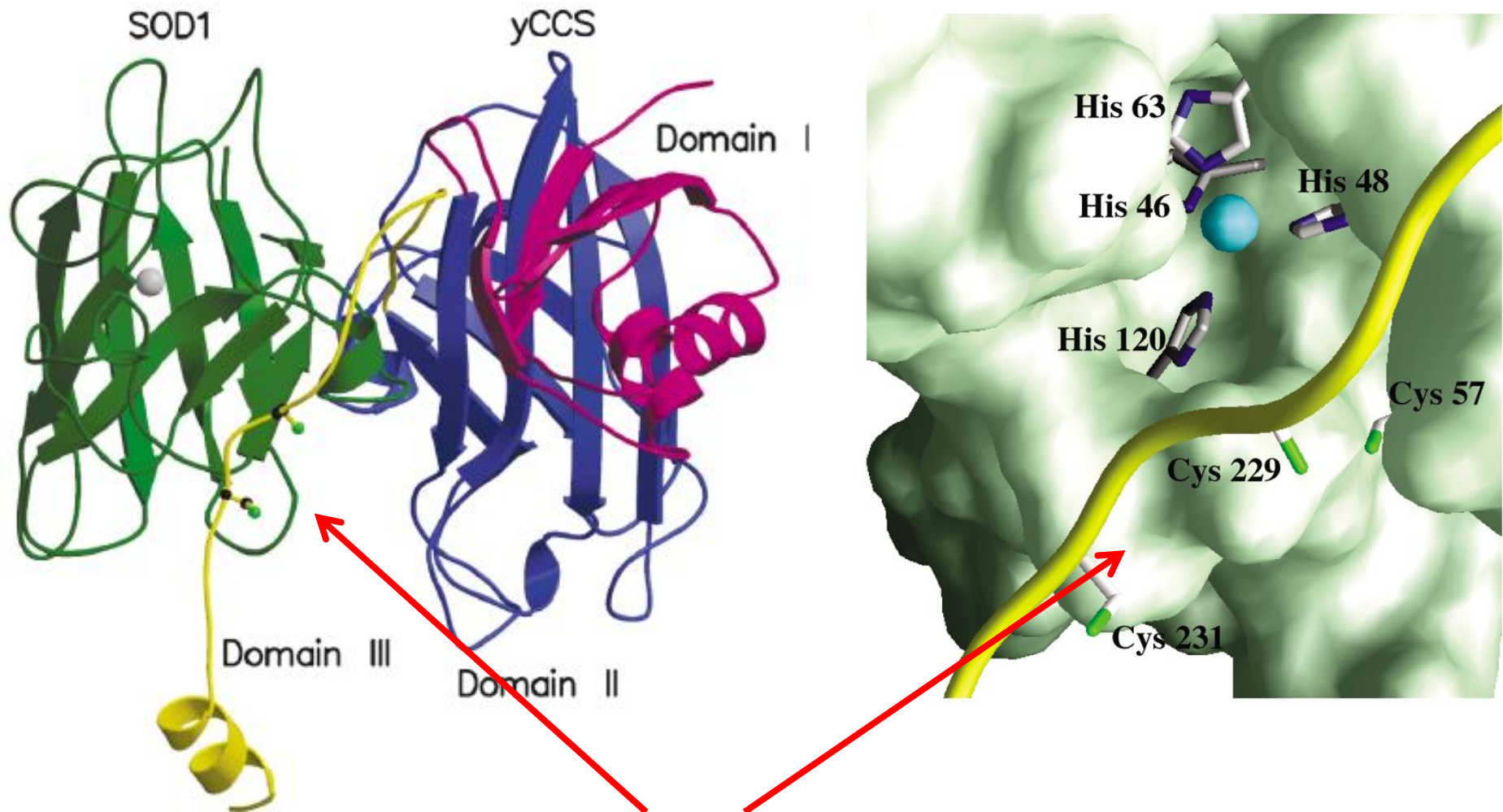


Hah1



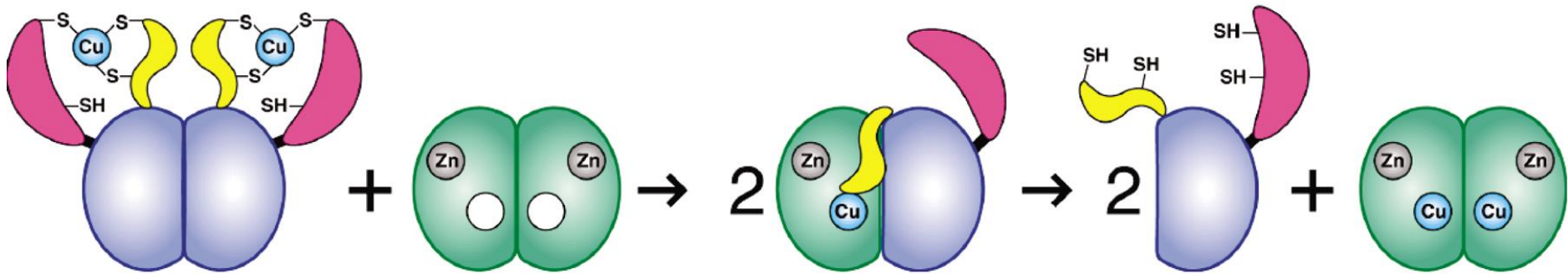
Sco1

# CCS/Zn-SOD

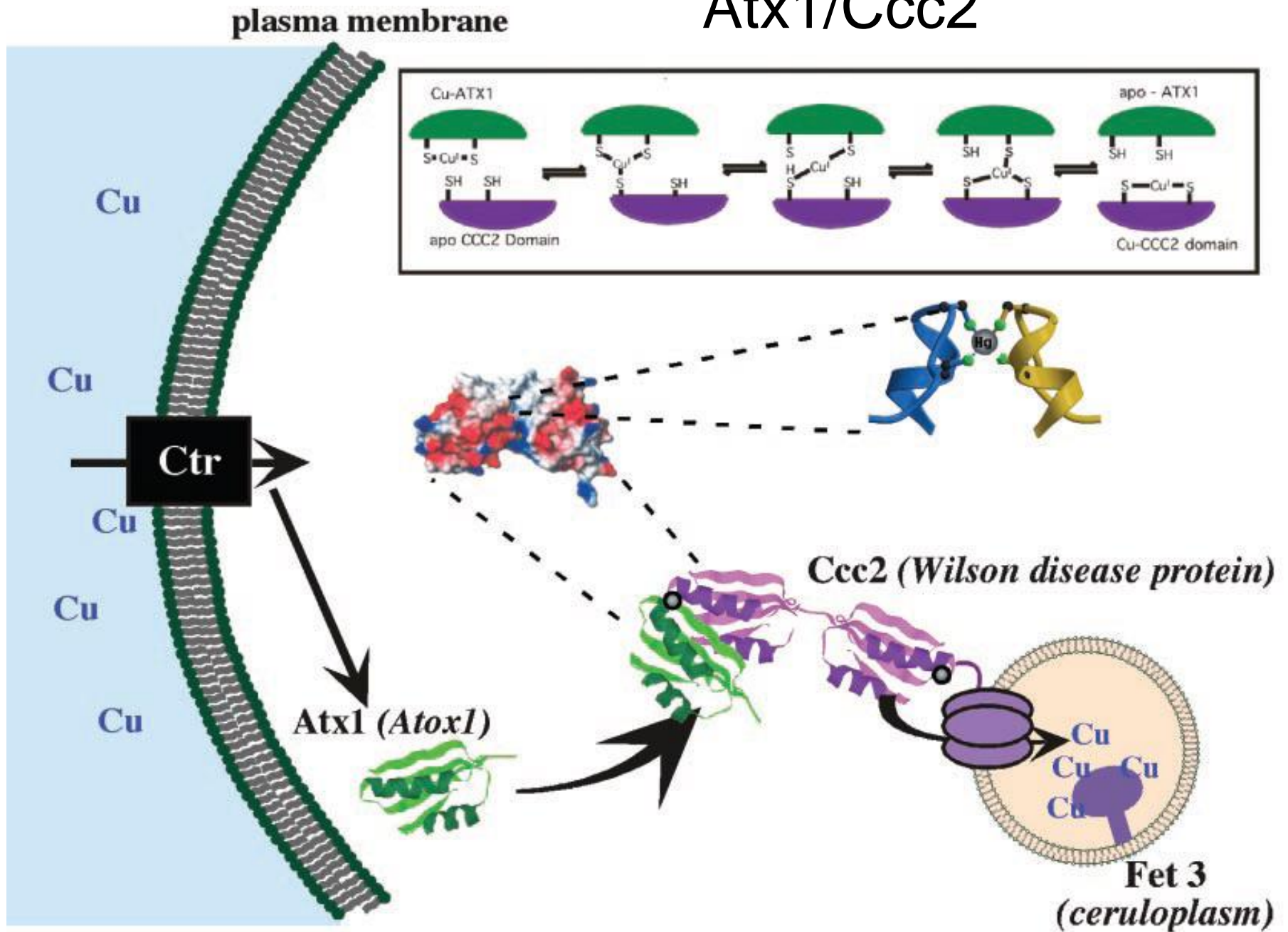


Sito di binding del Cu(I)

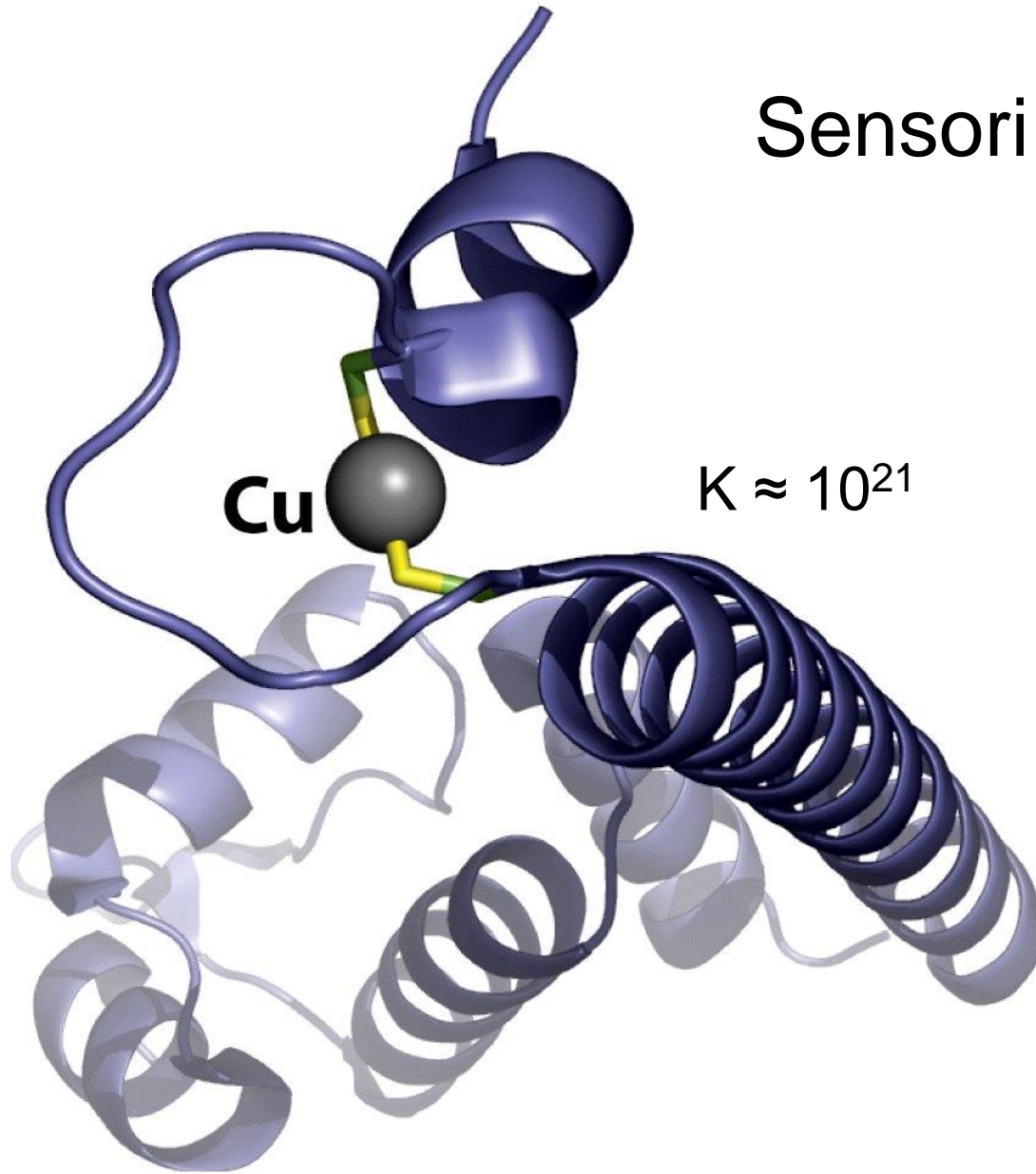
# CCS/Zn-SOD



# Atx1/Ccc2



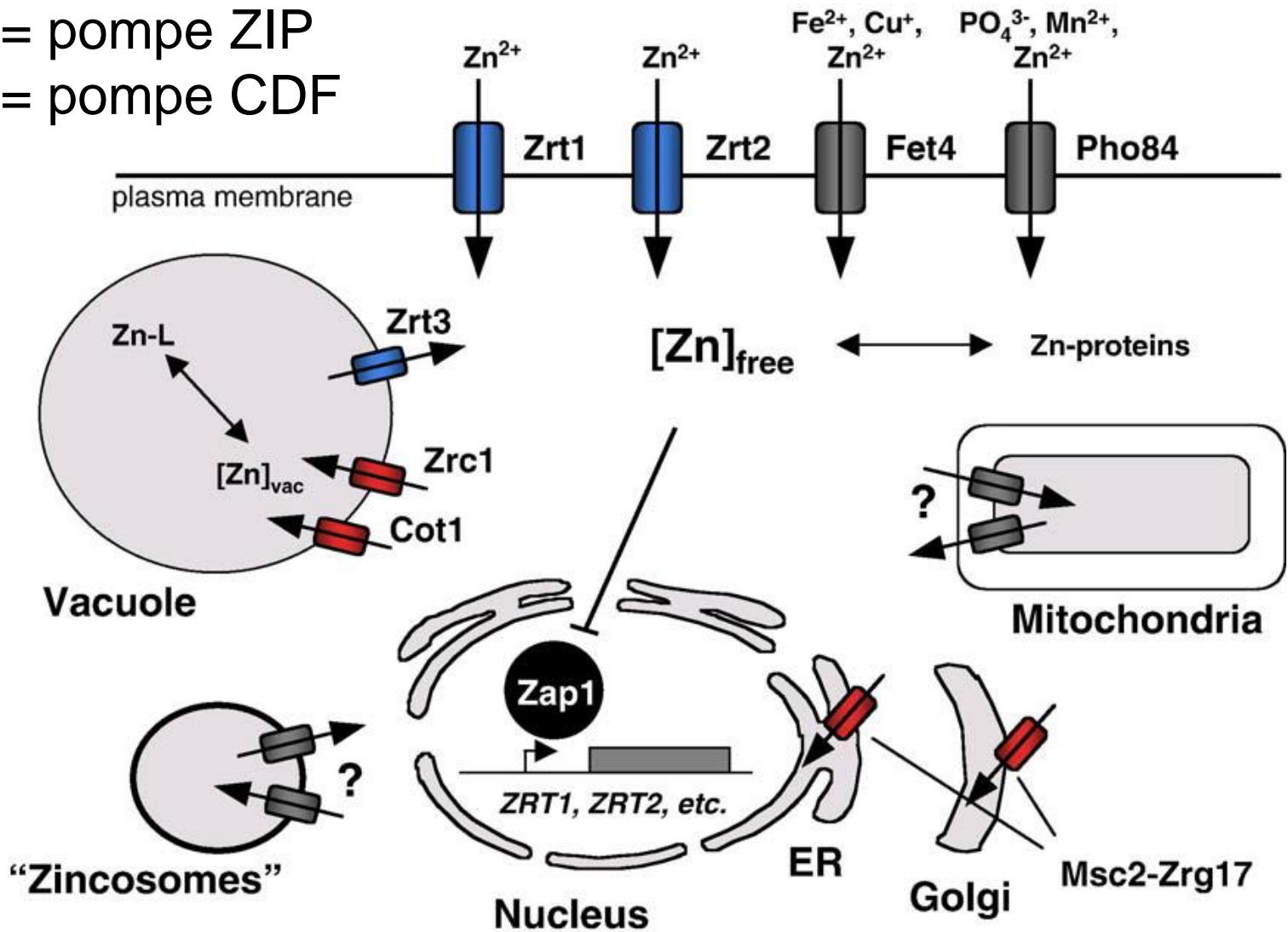
# Sensori del Cu



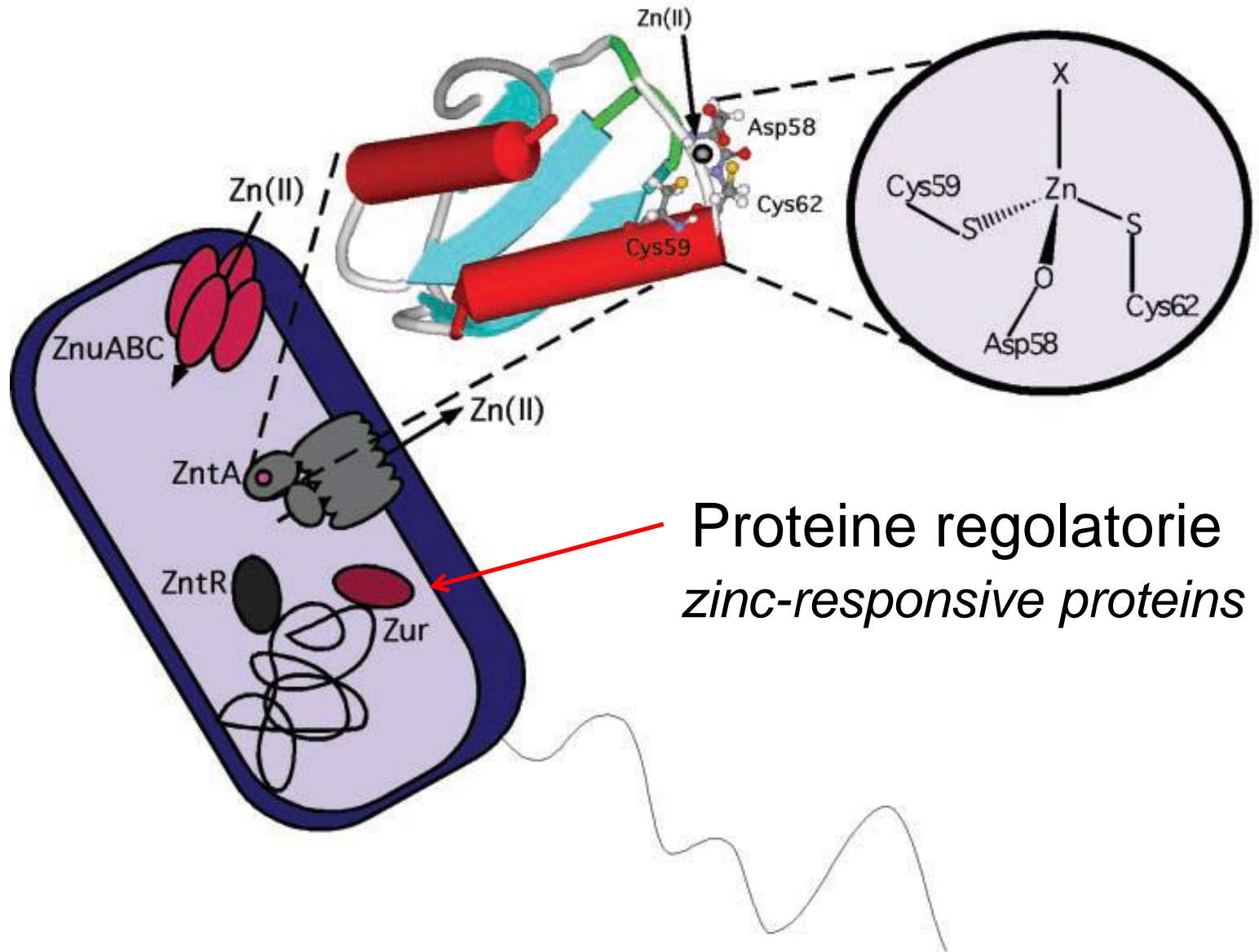
Fattore di trascrizione CueR (da *E. Coli*)

# Omeostasi dello zinco in cellule eucariote

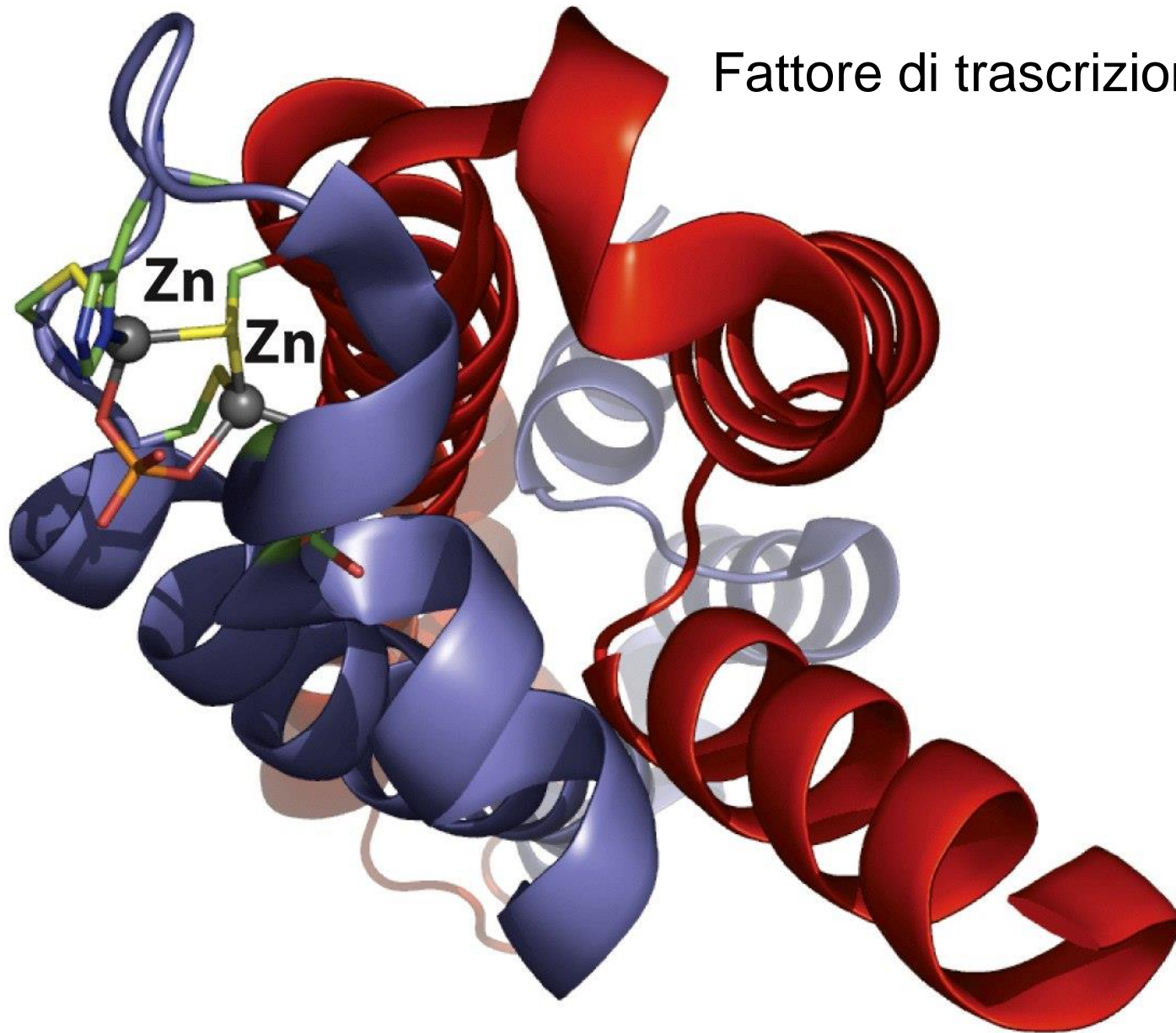
- = pompe ZIP
- = pompe CDF



# Omeostasi dello zinco nei batteri

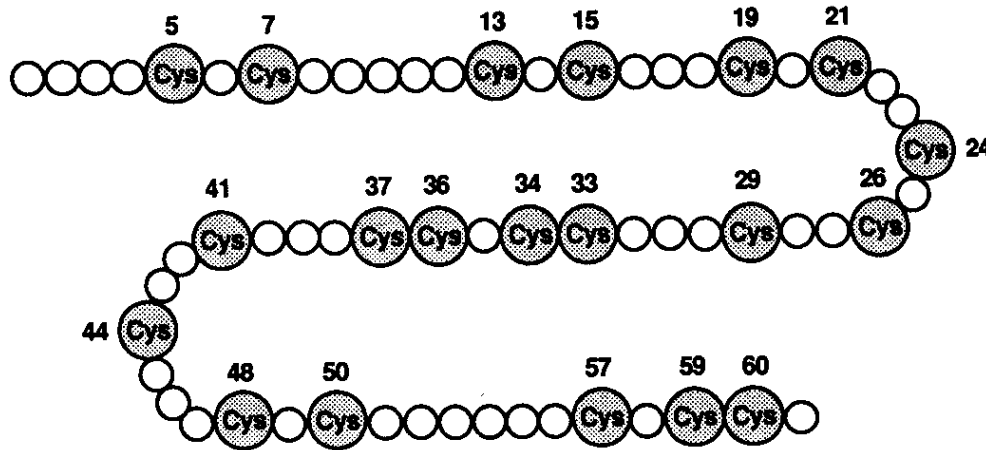


# Fattore di trascrizione ZntR

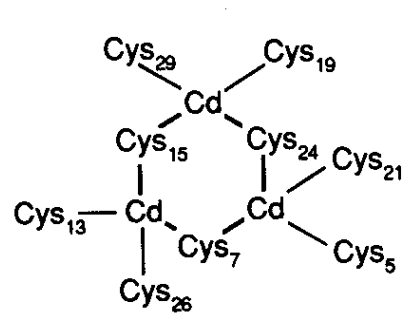




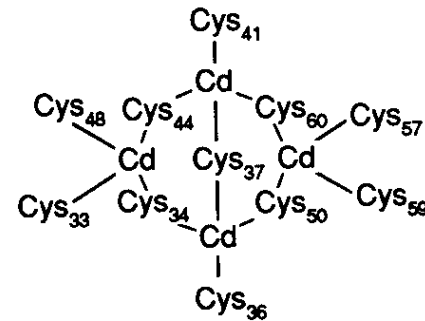
# Metallotioneine



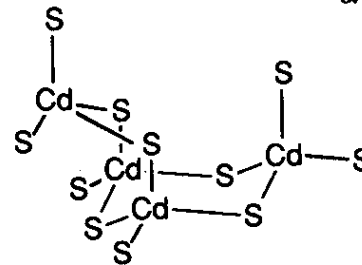
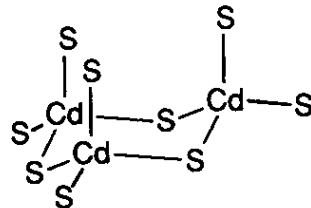
6 kDa,  
ca. 60 a.a.  
fino 30% cys



$\beta$



$\alpha$



# Metallotioneine

