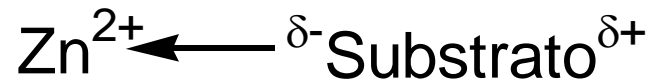
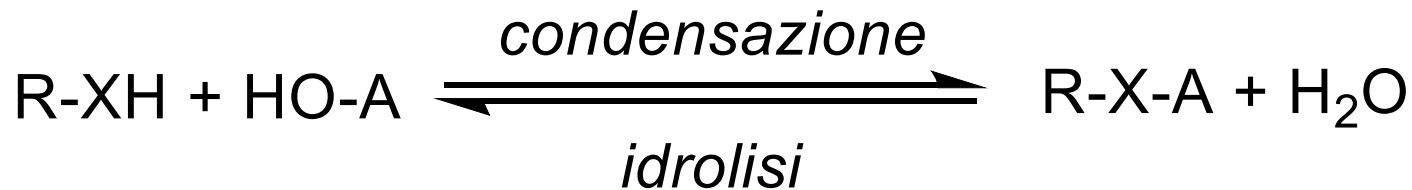


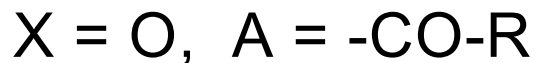
Zn²⁺ come acido di Lewis



Lo ione idrossido coordinato allo zinco, [Zn-OH]⁺, è meno nucleofilo di OH⁻ libero, ma decisamente più nucleofilo di H₂O e molto più abbondante di OH⁻ a pH fisiologico.



peptidasi, lattamasi, collagenasi



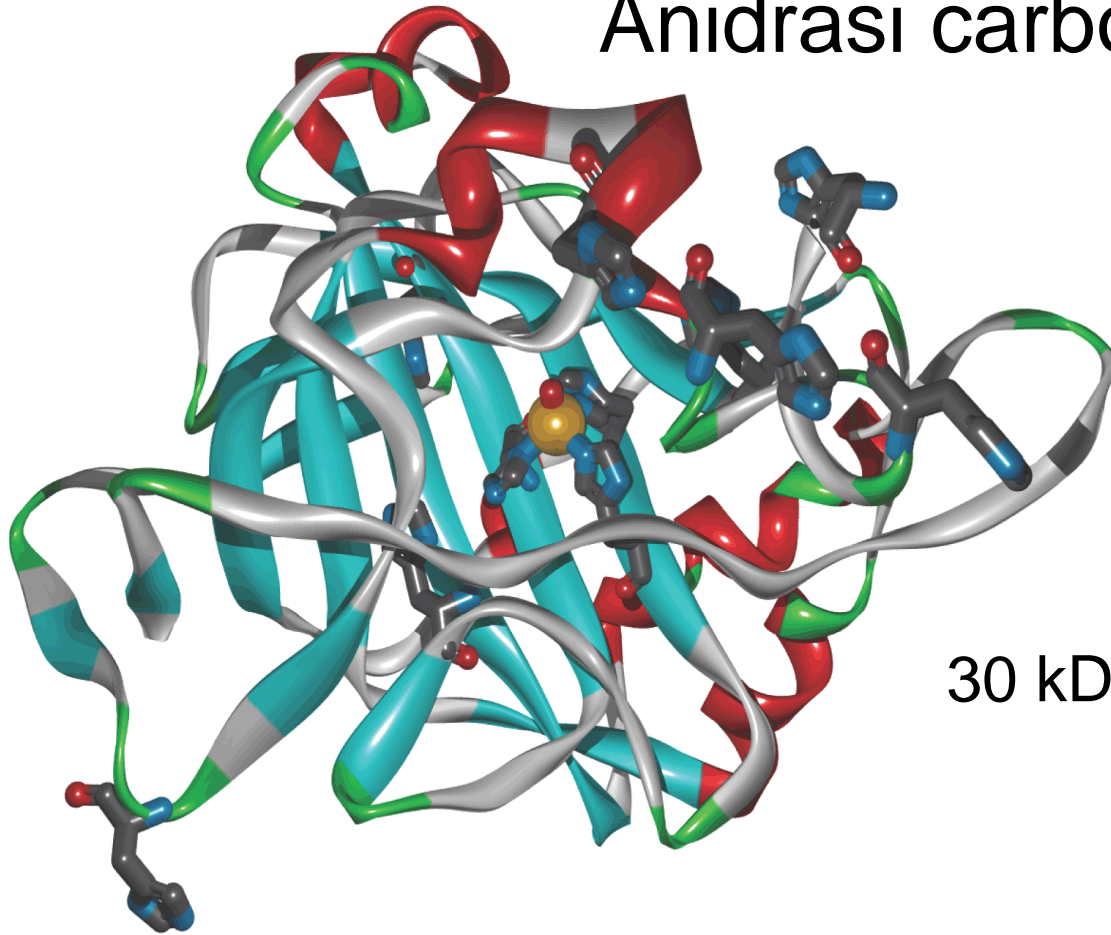
esterasi



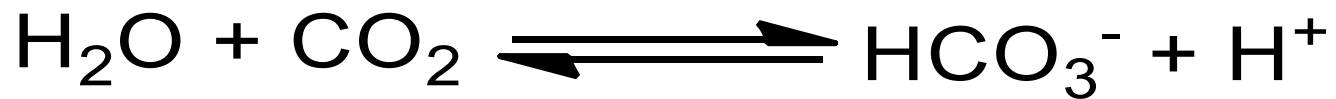
fosfatasi, nucleasi

- Esclusivamente Zn^{2+}
- d^{10} (no LFSE)
- Numeri di coordinazione e geometria flessibili
- Ruolo catalitico (acido di Lewis) o strutturale
- Più di 200 Zn-proteine (*zincosoma*)

Anidrase carbonica

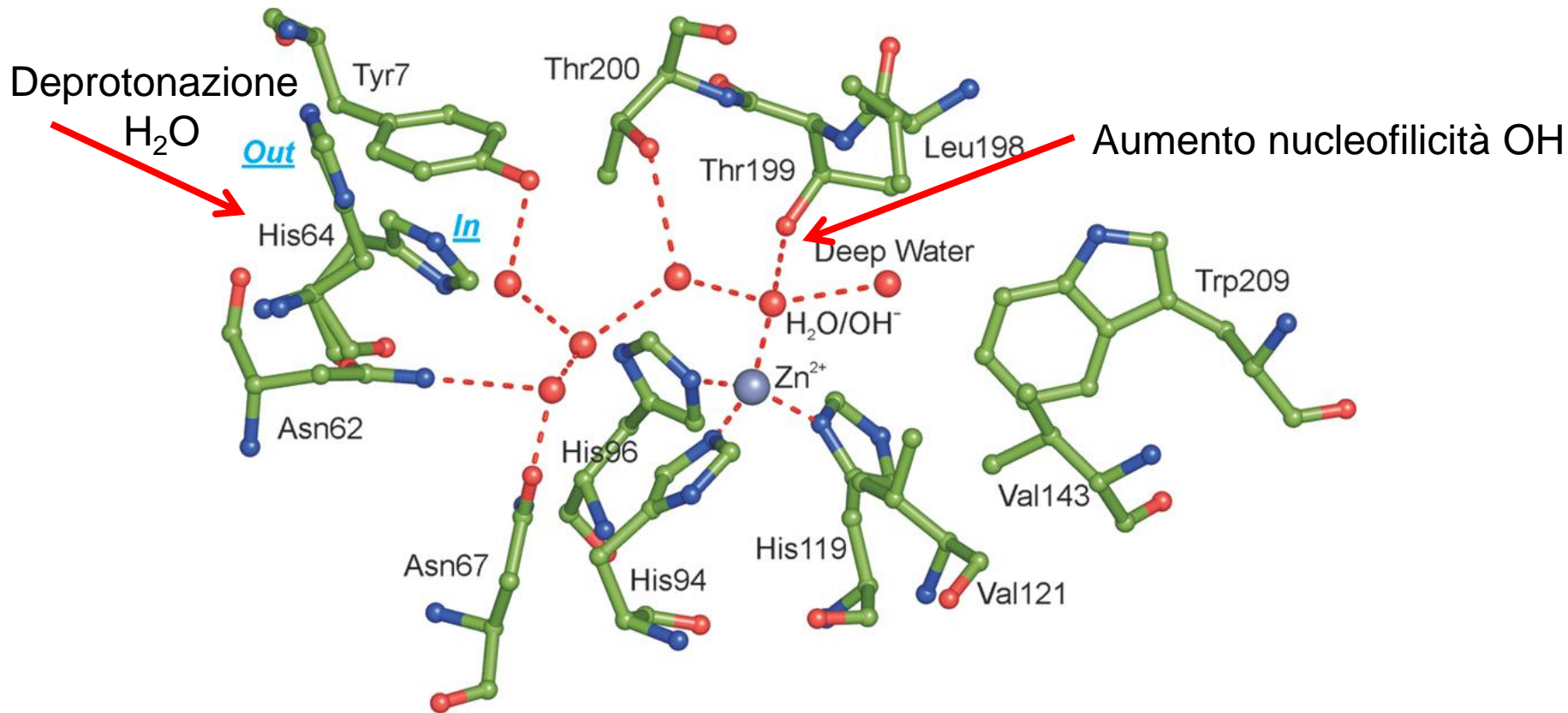
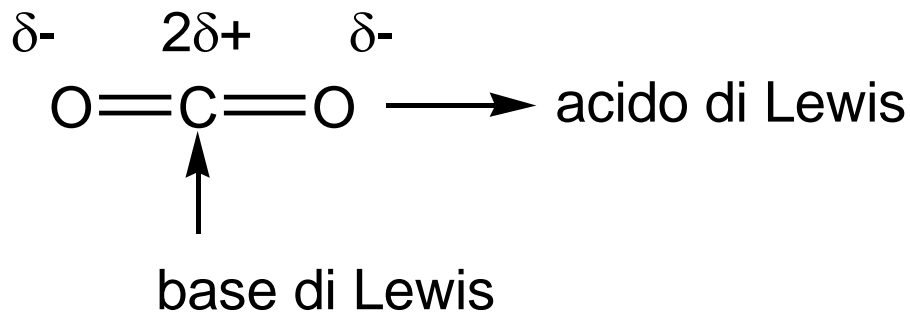


30 kDa, 259 a.a.

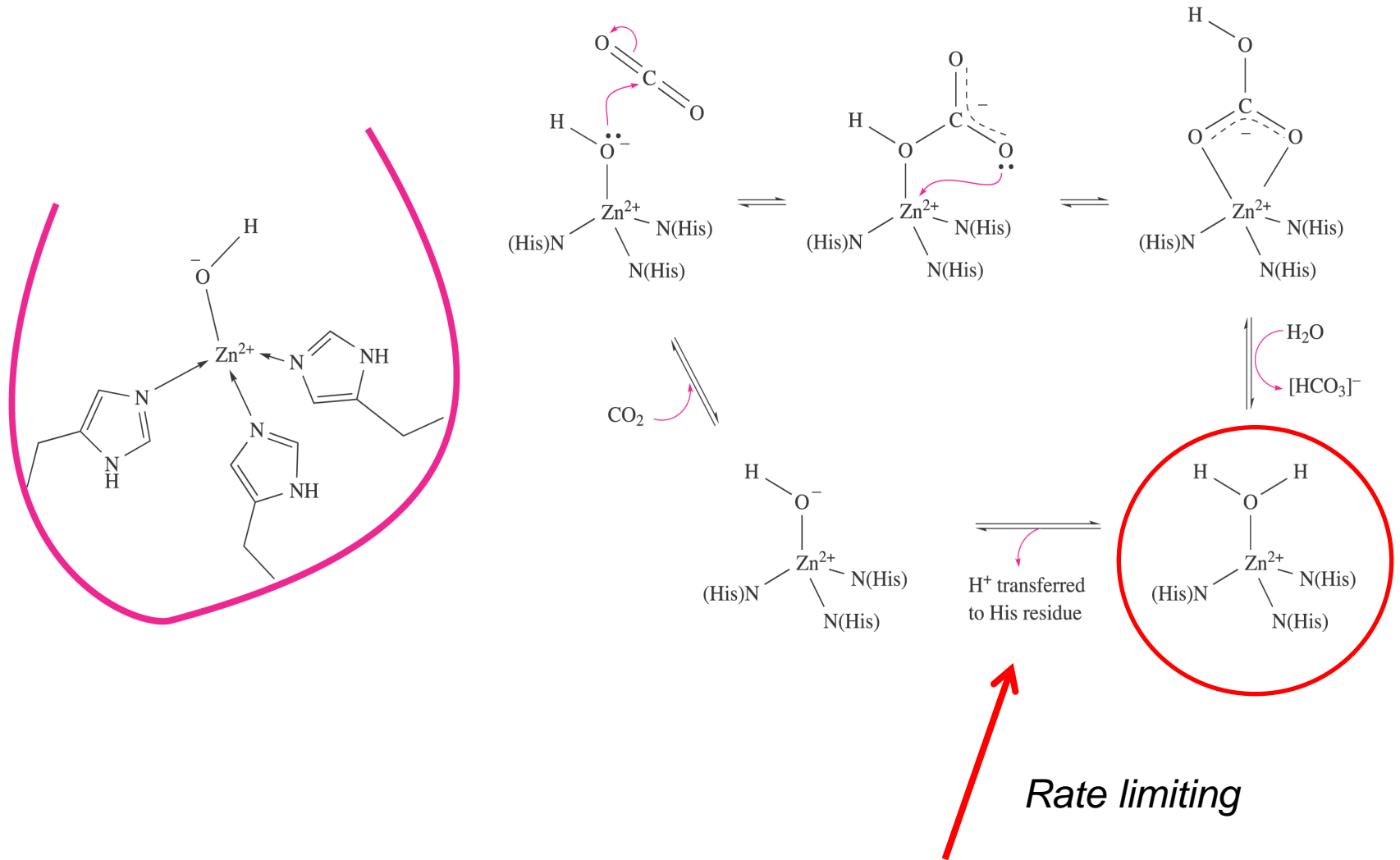


$$k \approx 10^{-1} \text{ s}^{-1} \rightarrow 10^6 \text{ s}^{-1}$$

Sito catalitico della anidraasi carbonica

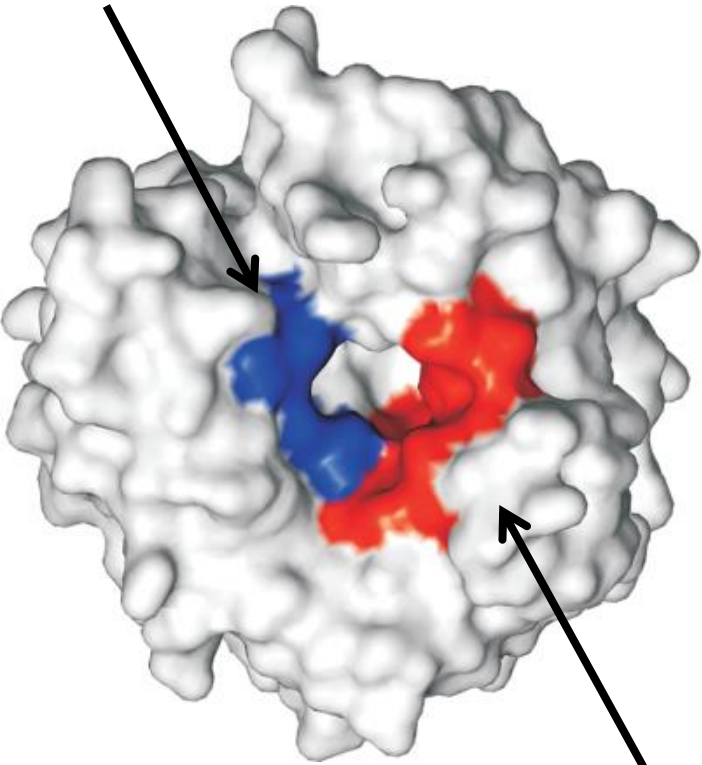


Ciclo catalitico della anidraasi carbonica

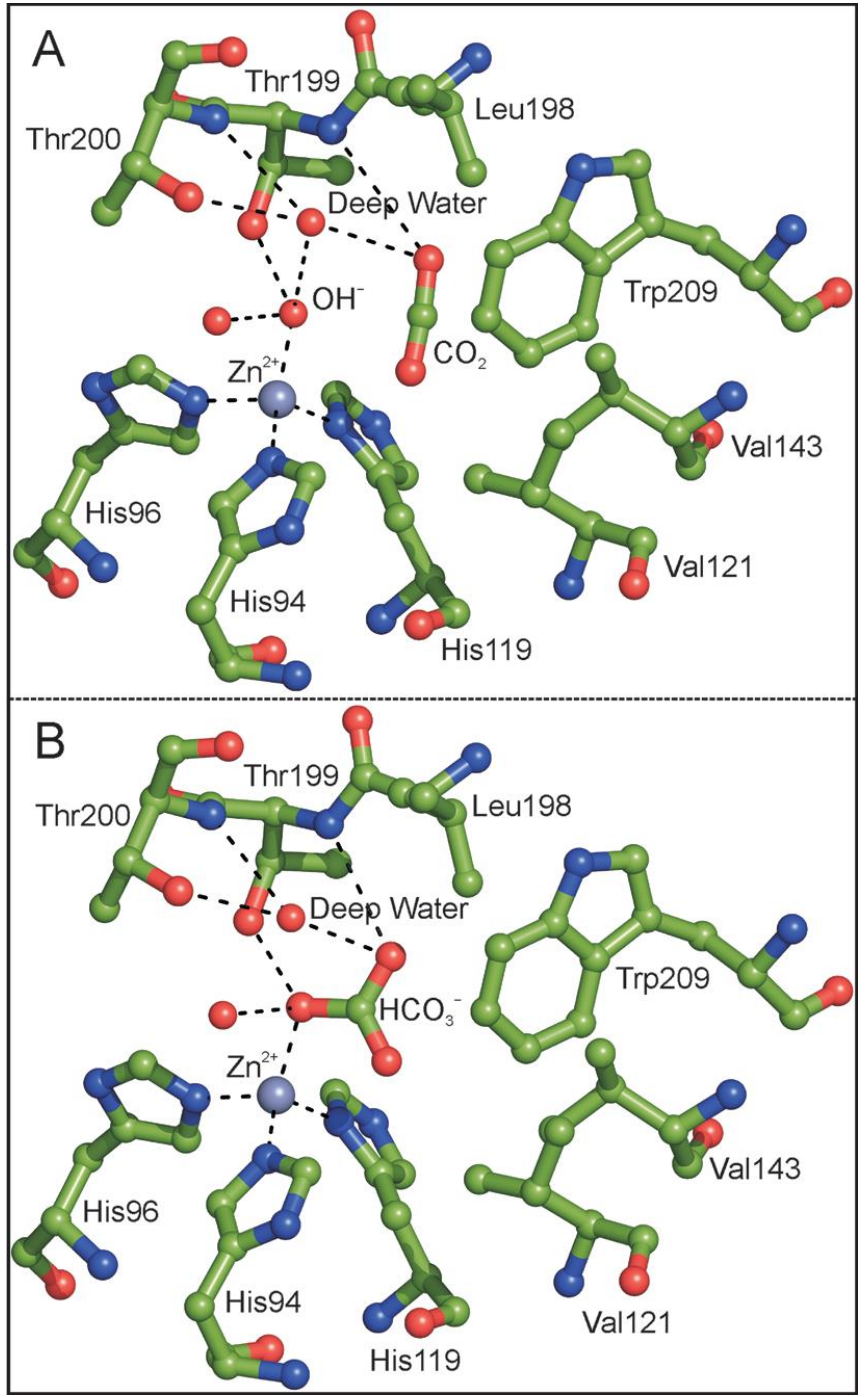


Cavità del sito catalitico nelle CA

Regione idrofilica

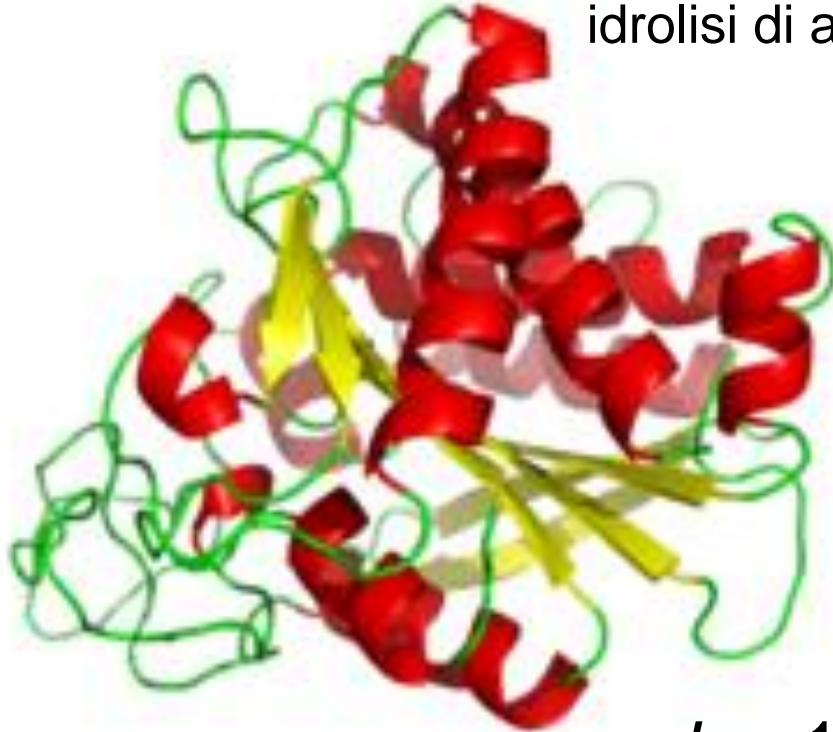


Regione idrofobica



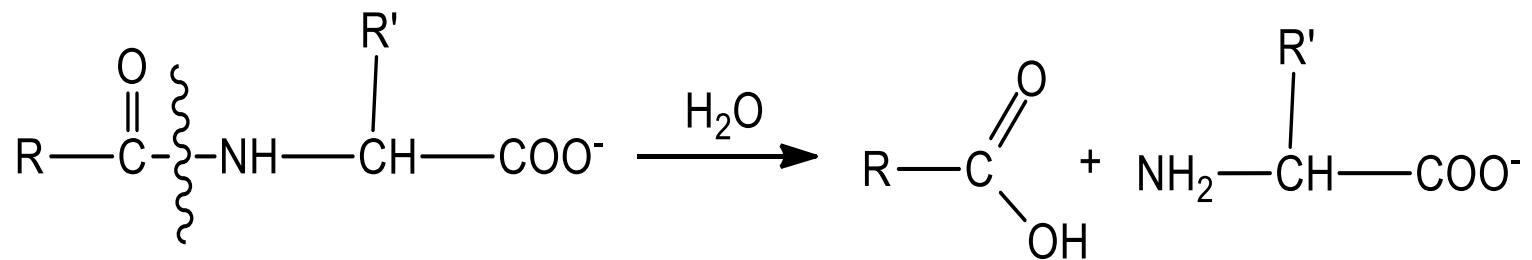
Carbossipeptidasi A (CPD A)

idrolisi di amminoacidi C-terminali

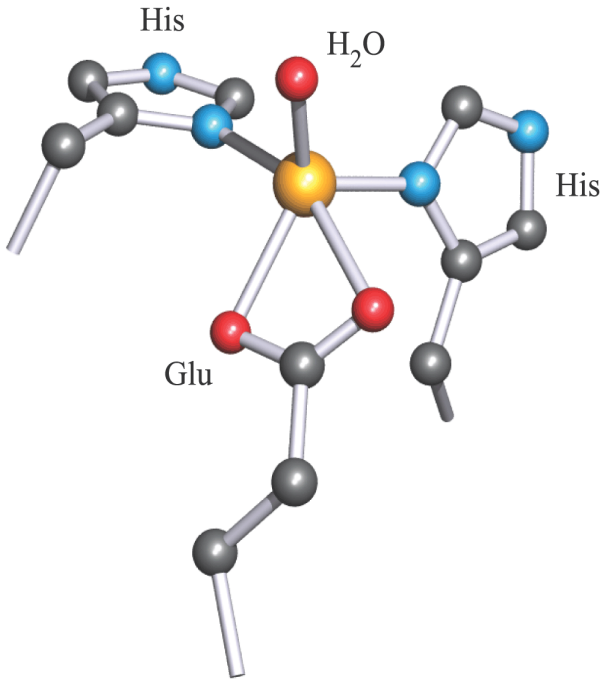


34 kDa, 300 a.a.

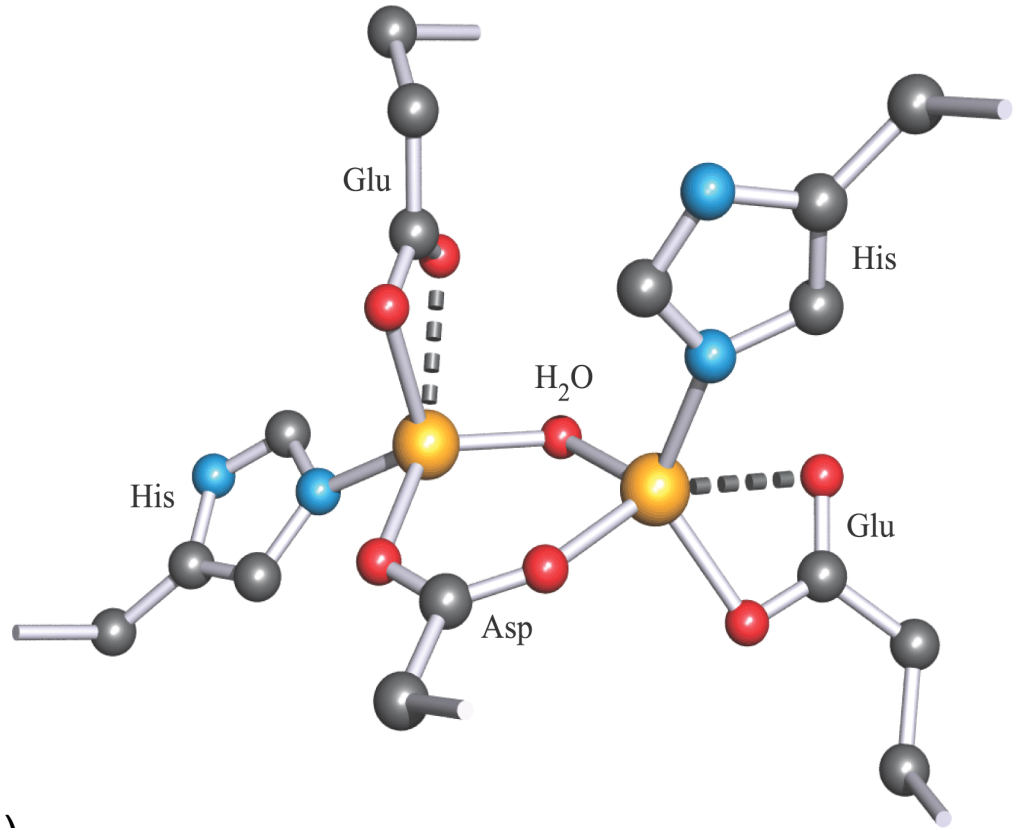
$$k \approx 10^{-11} \text{ s}^{-1} \rightarrow 10^4 \text{ s}^{-1}$$



Siti attivi di carbossipeptidasi

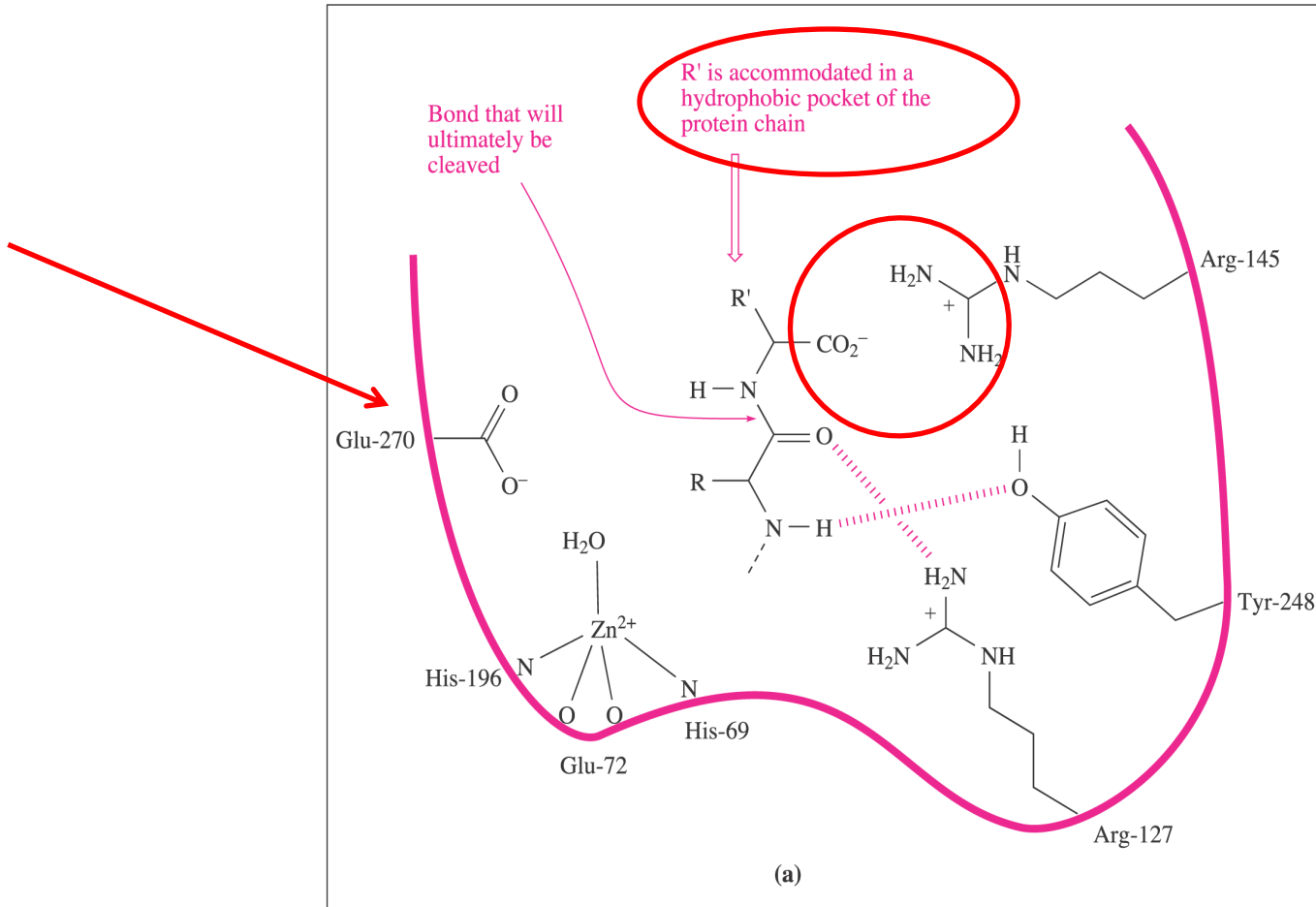


Carbossipeptidasi A (CPD A, bovino)

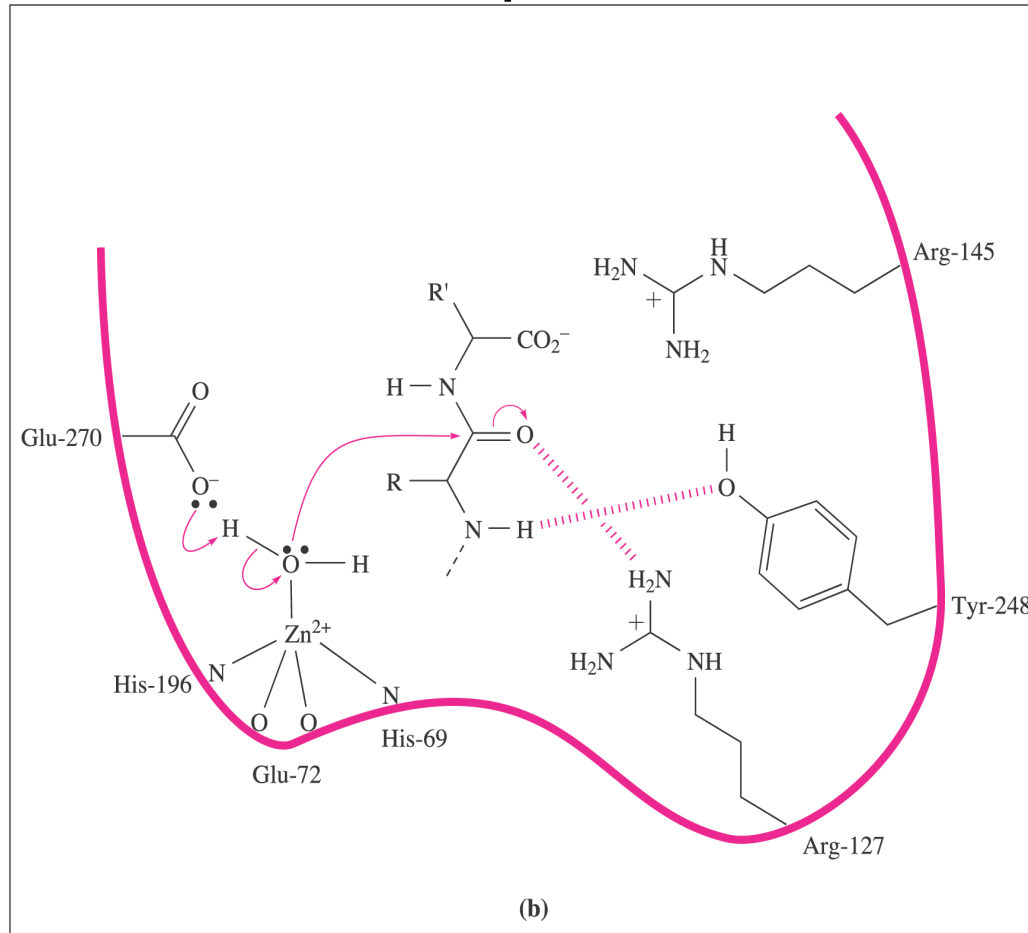


Carbossipeptidasi G2 (CPG2, batterio)

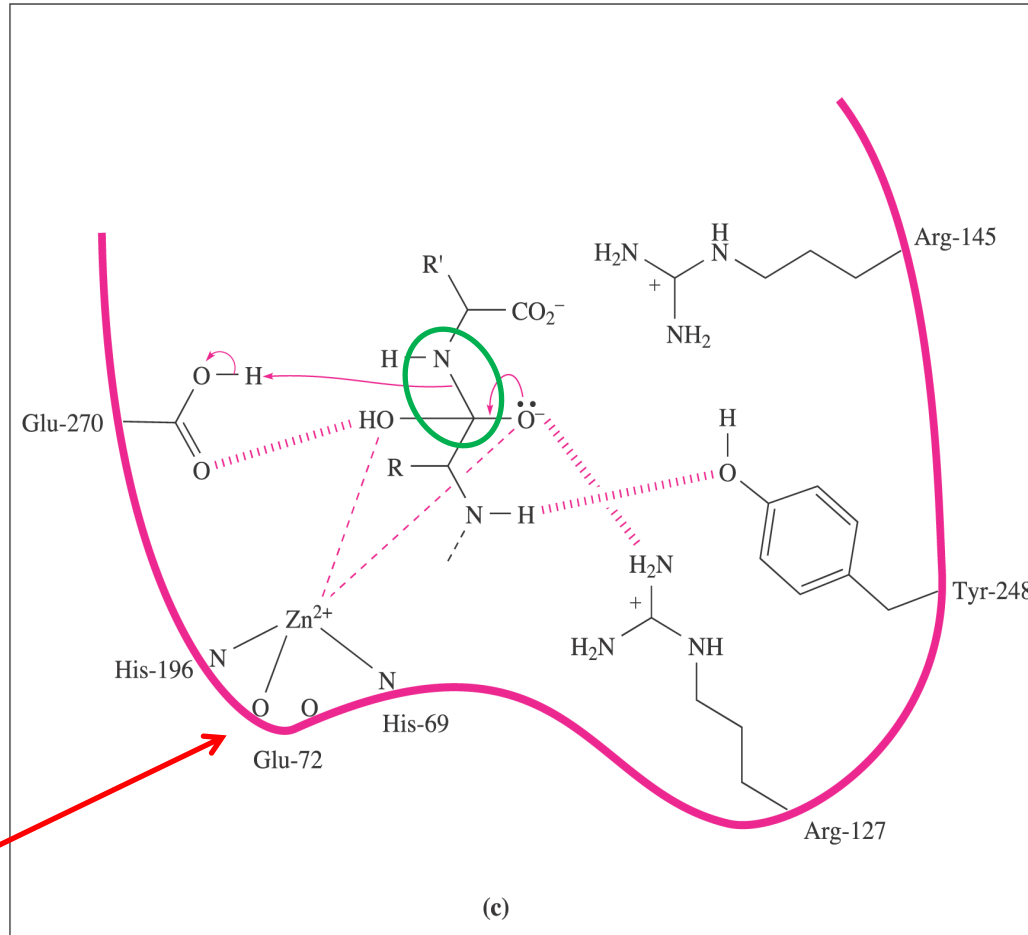
Posizionamento del substrato vicino al sito attivo della CPA



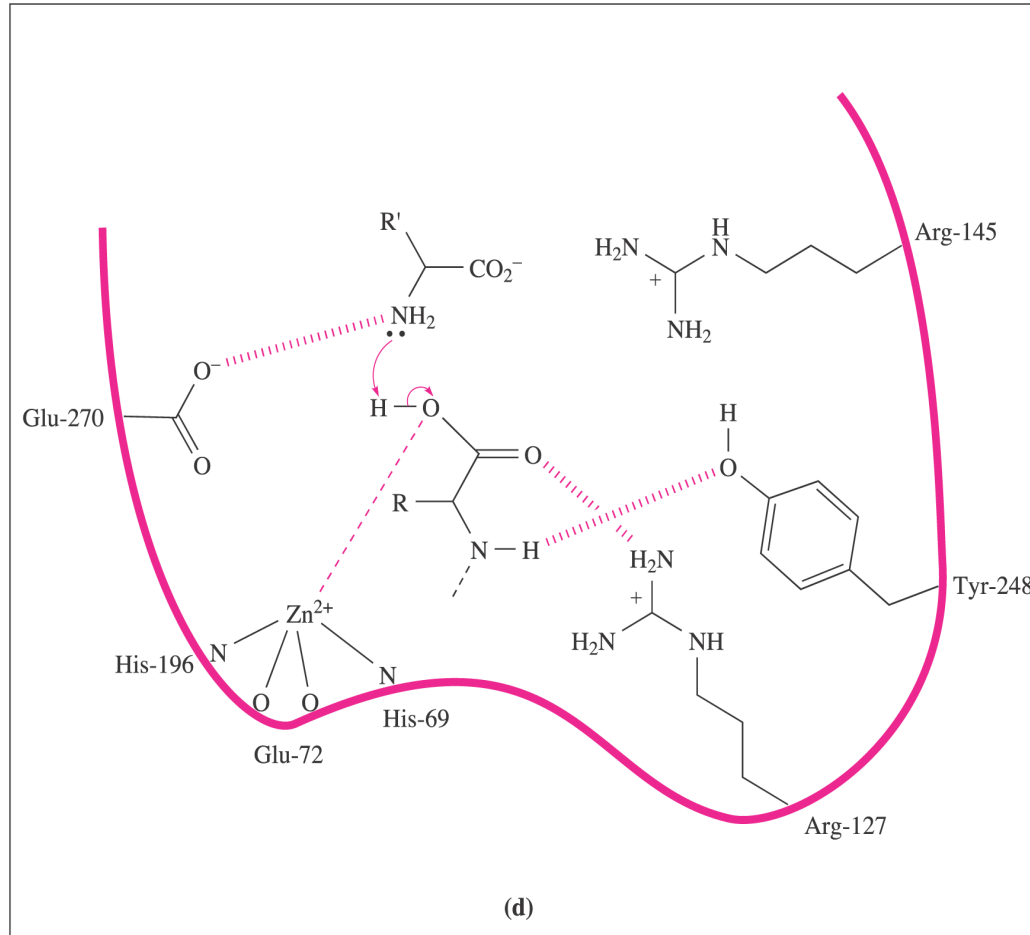
Deprotonazione dell'acqua e attacco nucleofilo



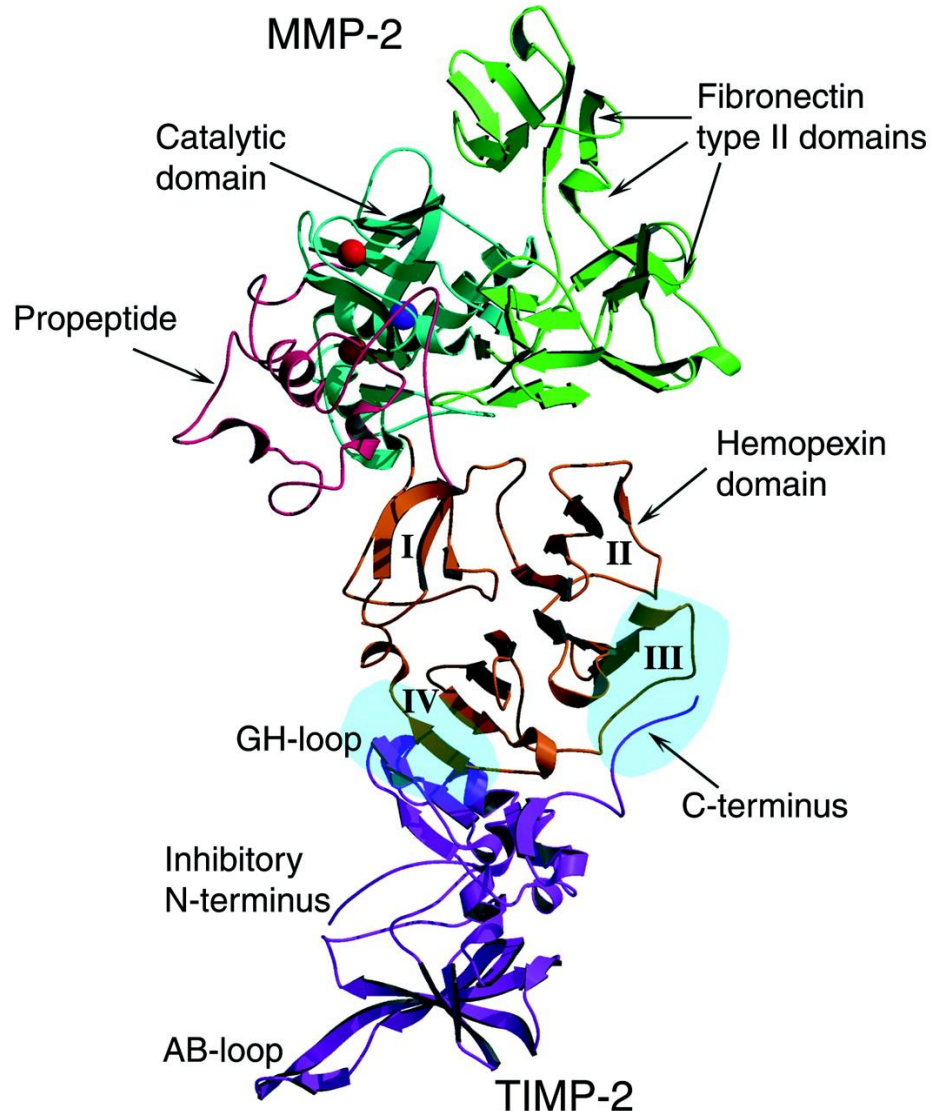
Rottura del legame peptidico C-N



Trasferimento di un protone con formazione di NH_3^+ e del carbossilato



Matrix MetalloProteinases (MMPs) + Tissue Inhibitors of MetalloProteinases (TIMPs)

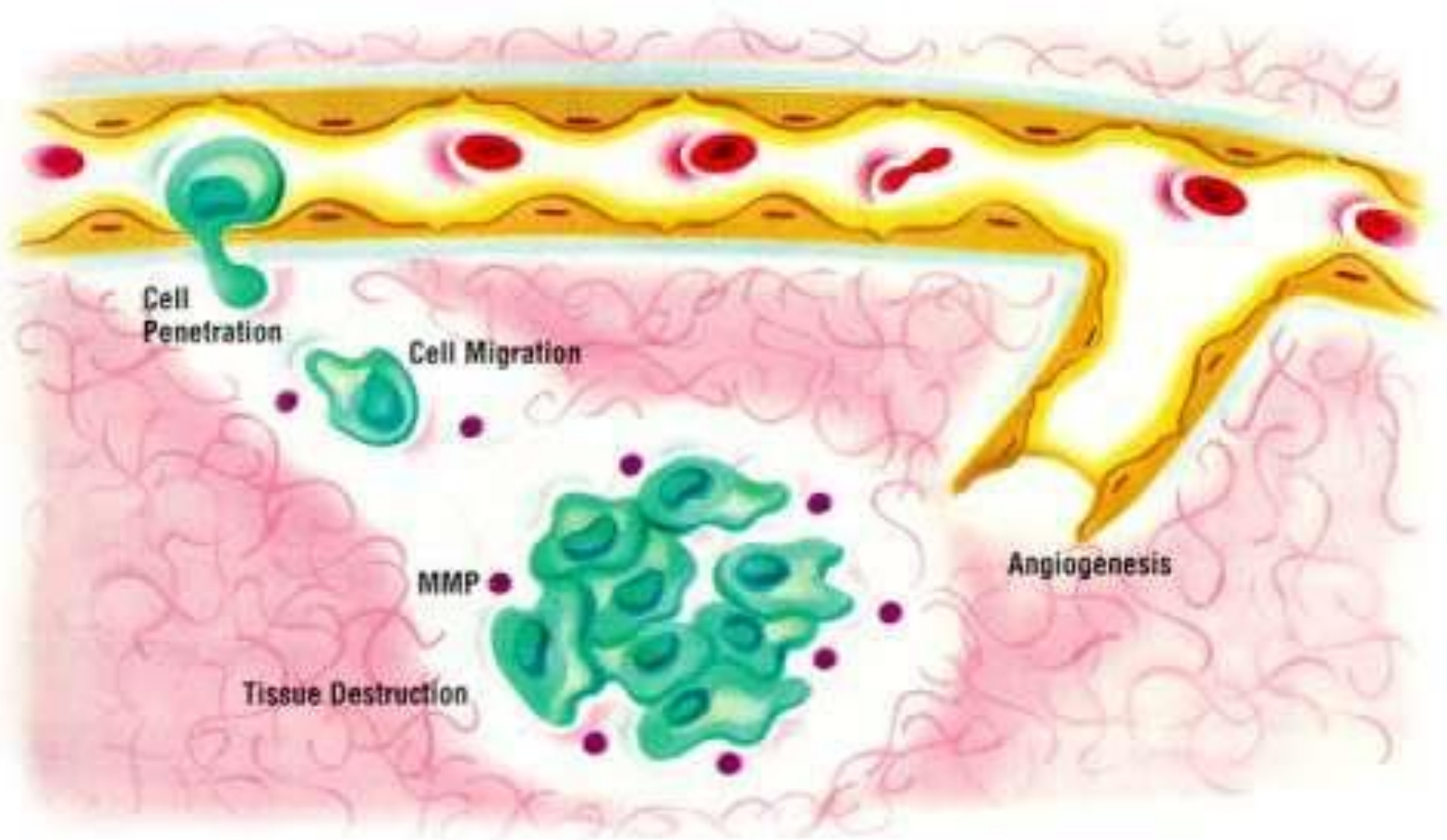


● = Zn

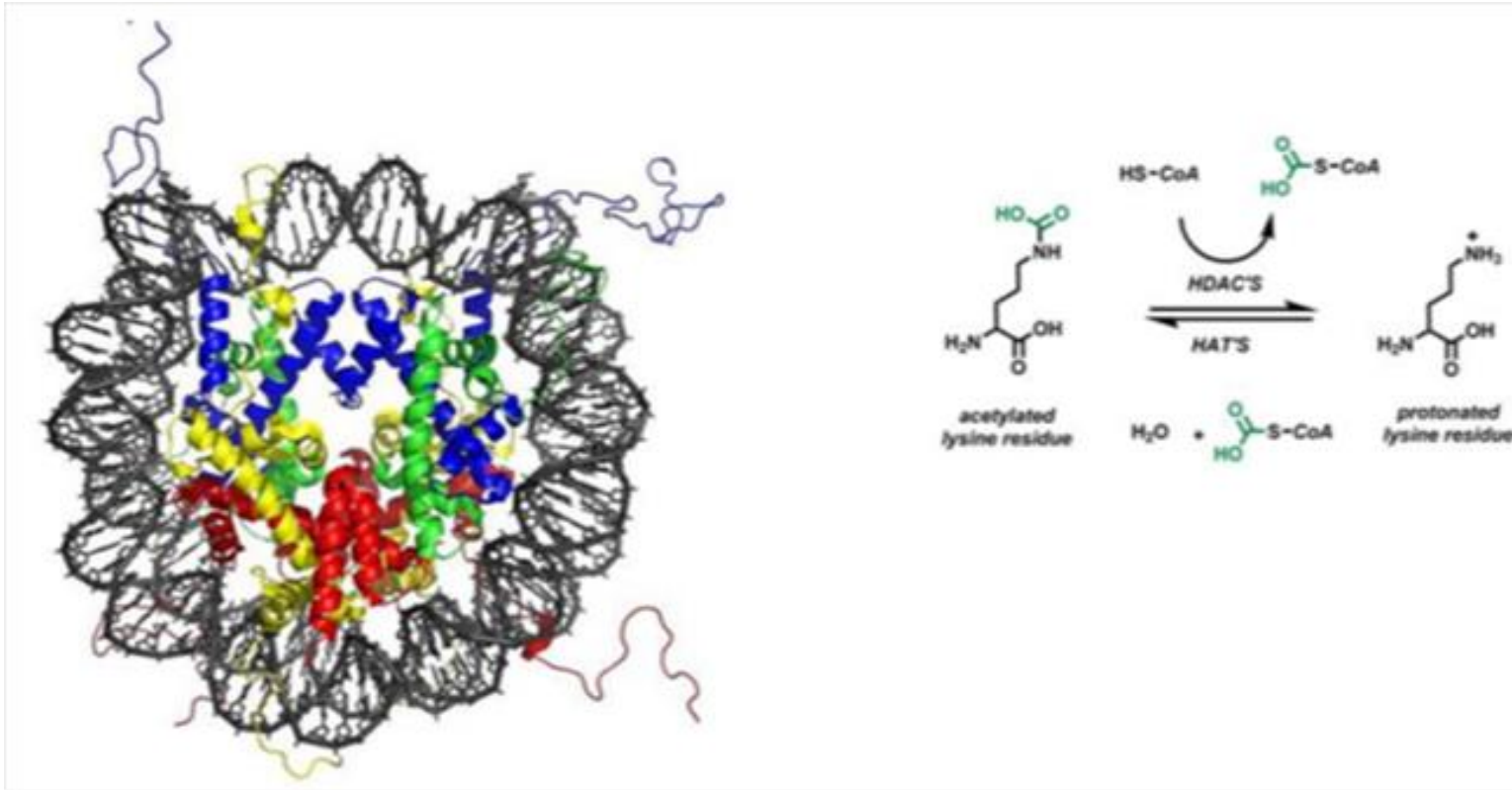
● = Ca

Zinco-endoropeptidasi,
degradano le proteine
che costituiscono le
matrici extracellulari (e.g.
il collagene)

Processo metastatico favorito da MMP

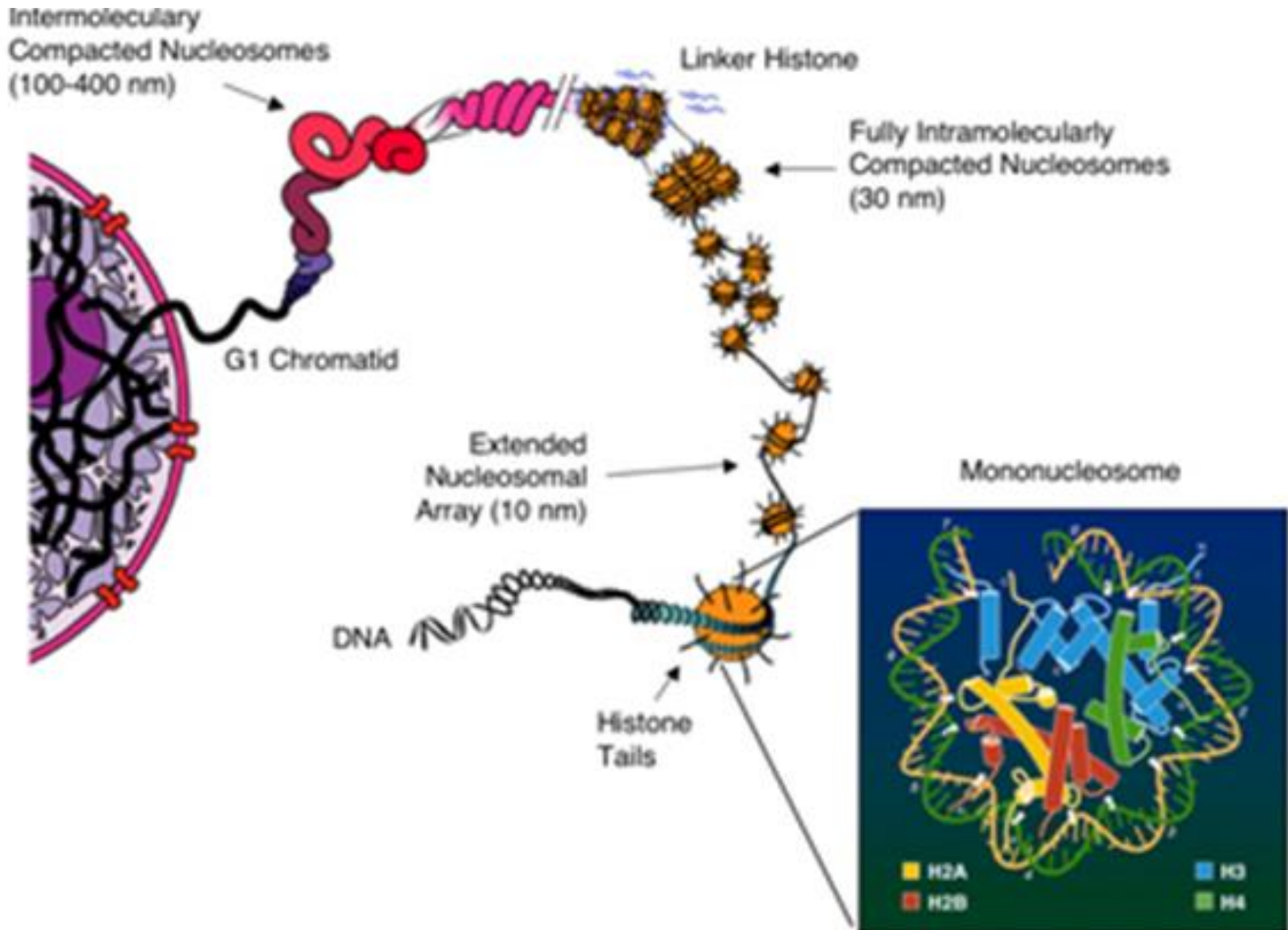


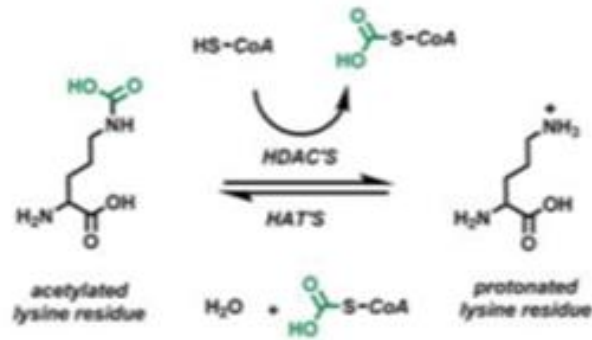
Istone deacetilasi (HDAC) e Istone acetiltrasferasi (HAT)



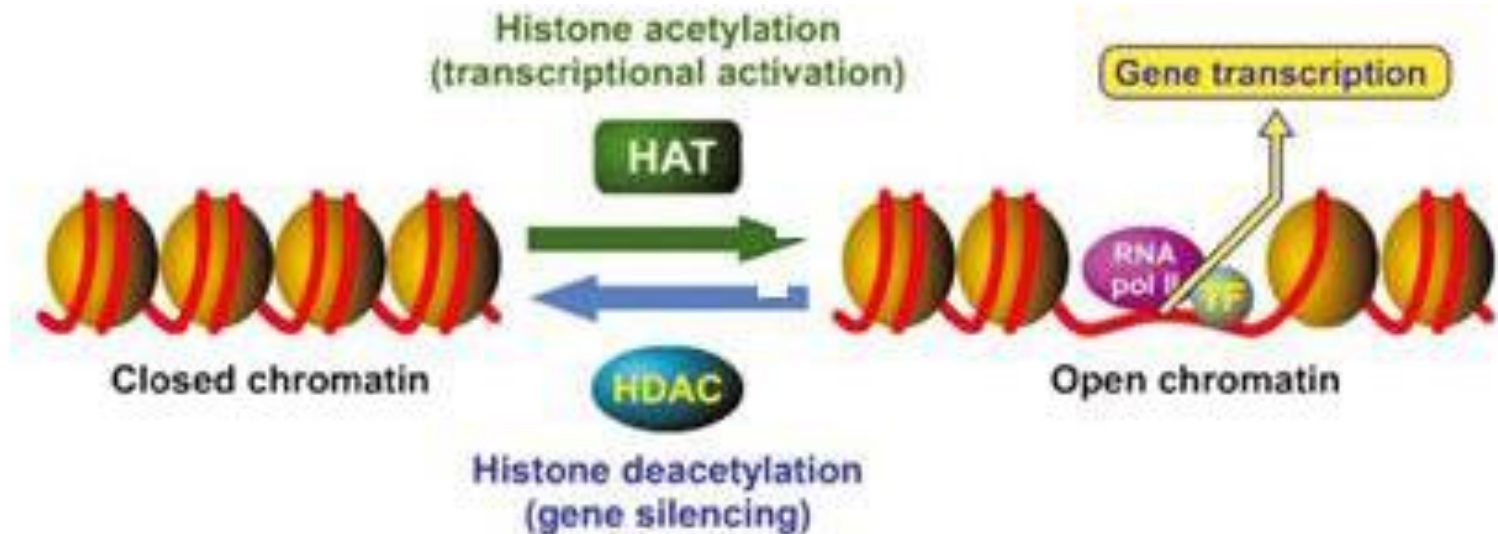
Nucleosoma e Istoni

Cromatina, Nucleosomi e Istoni



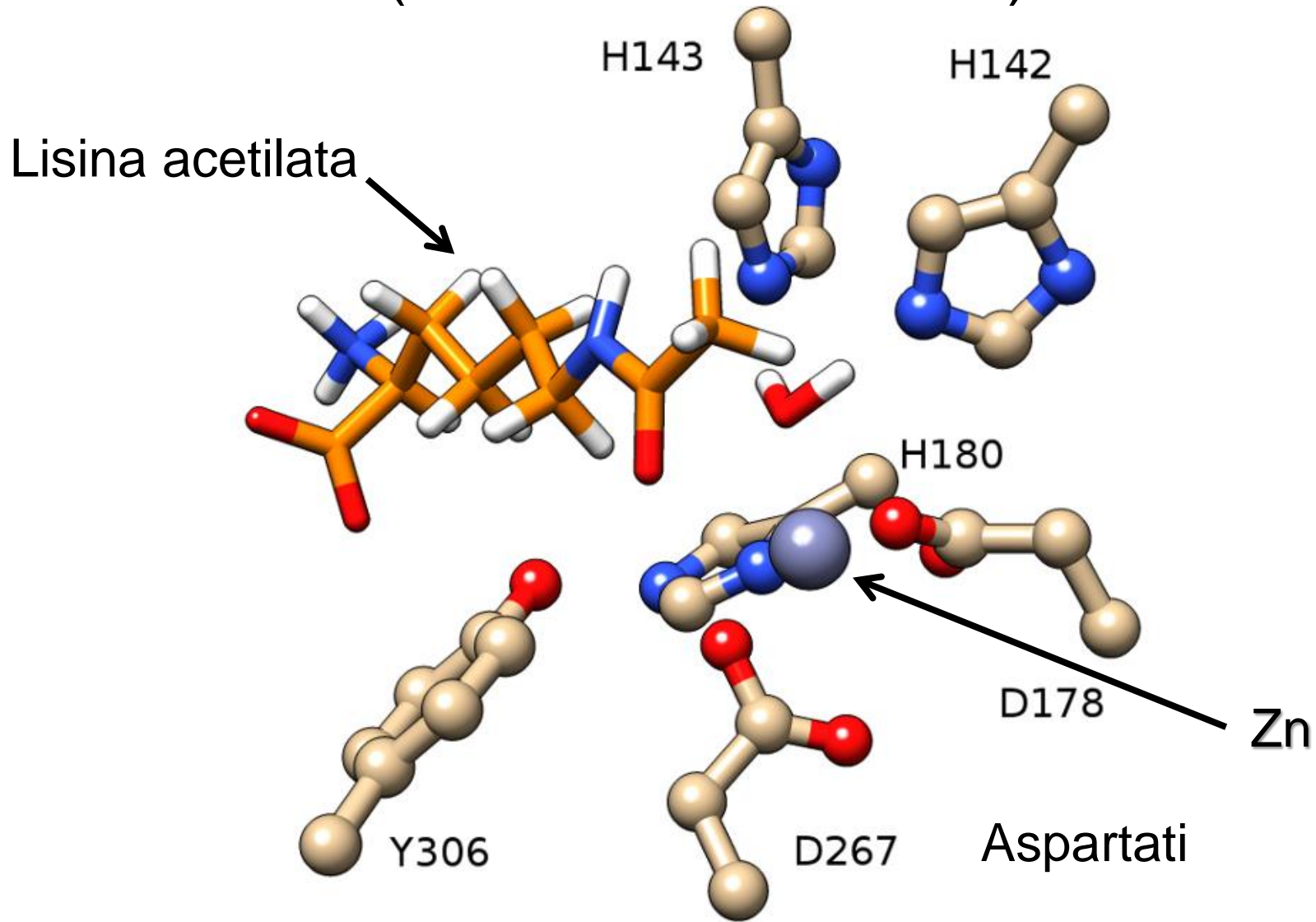


acetilazione e deacetilazione delle lisine degli istoni

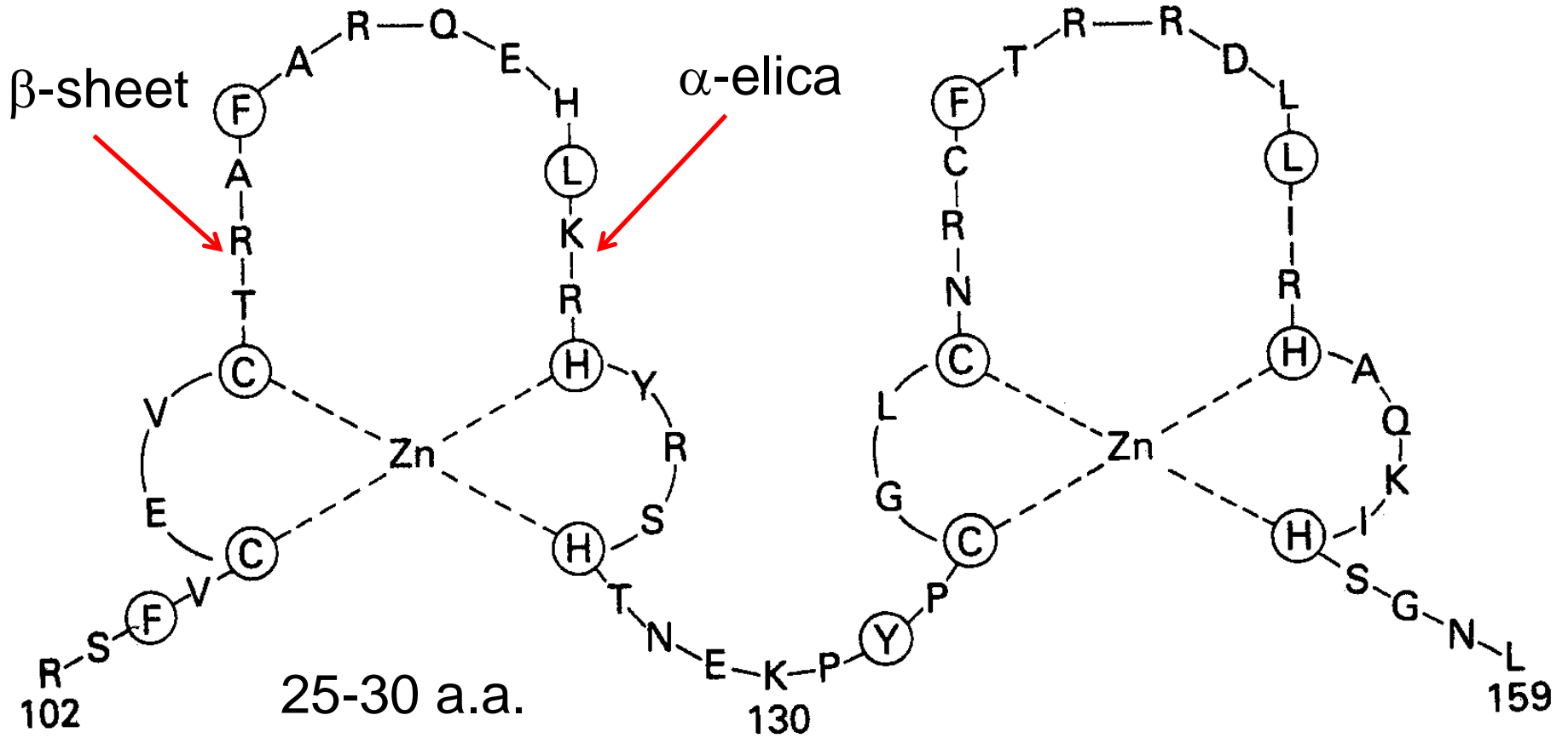


Modulazione epigenetica

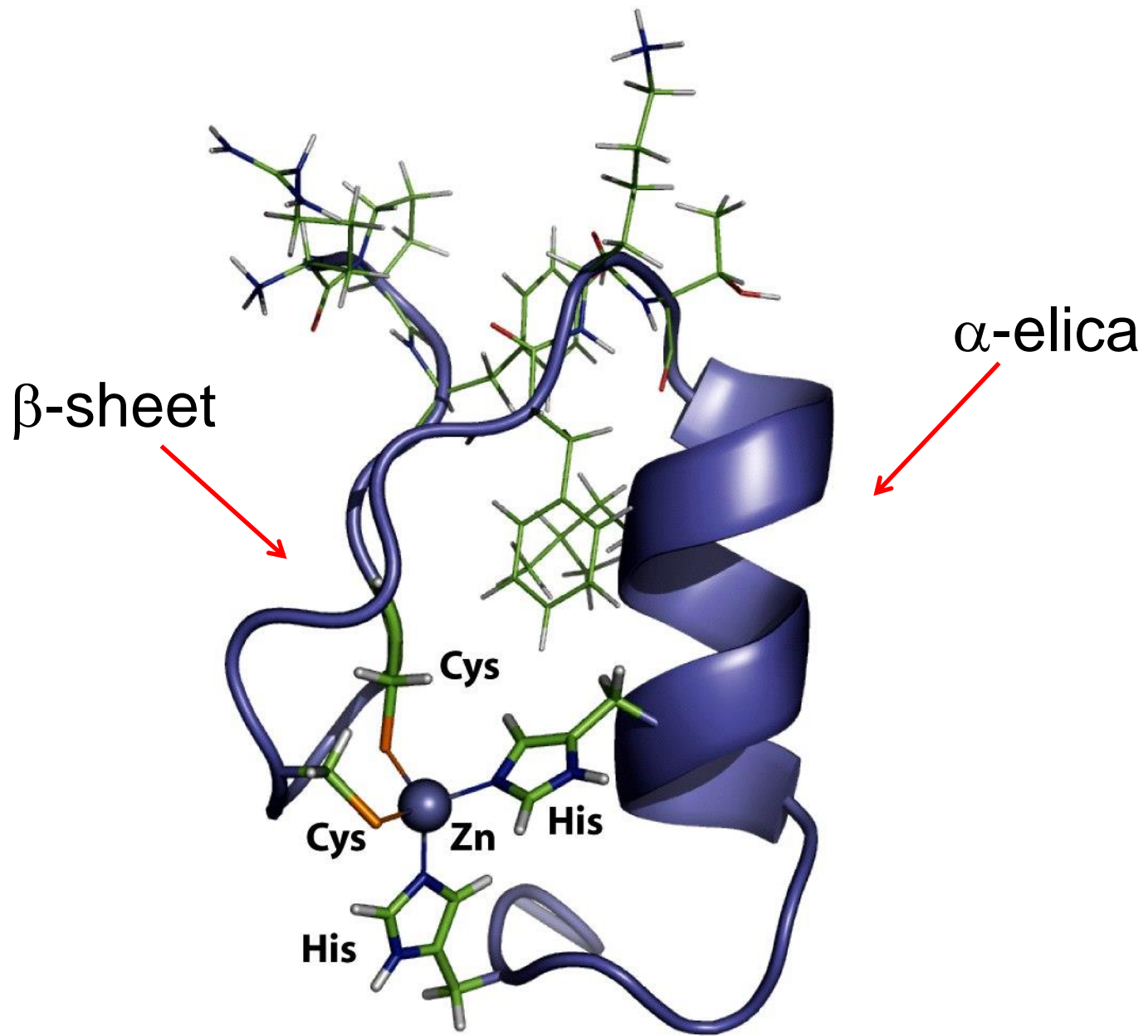
Sito attivo di HDAC8 (istone-deacetilasi 8)

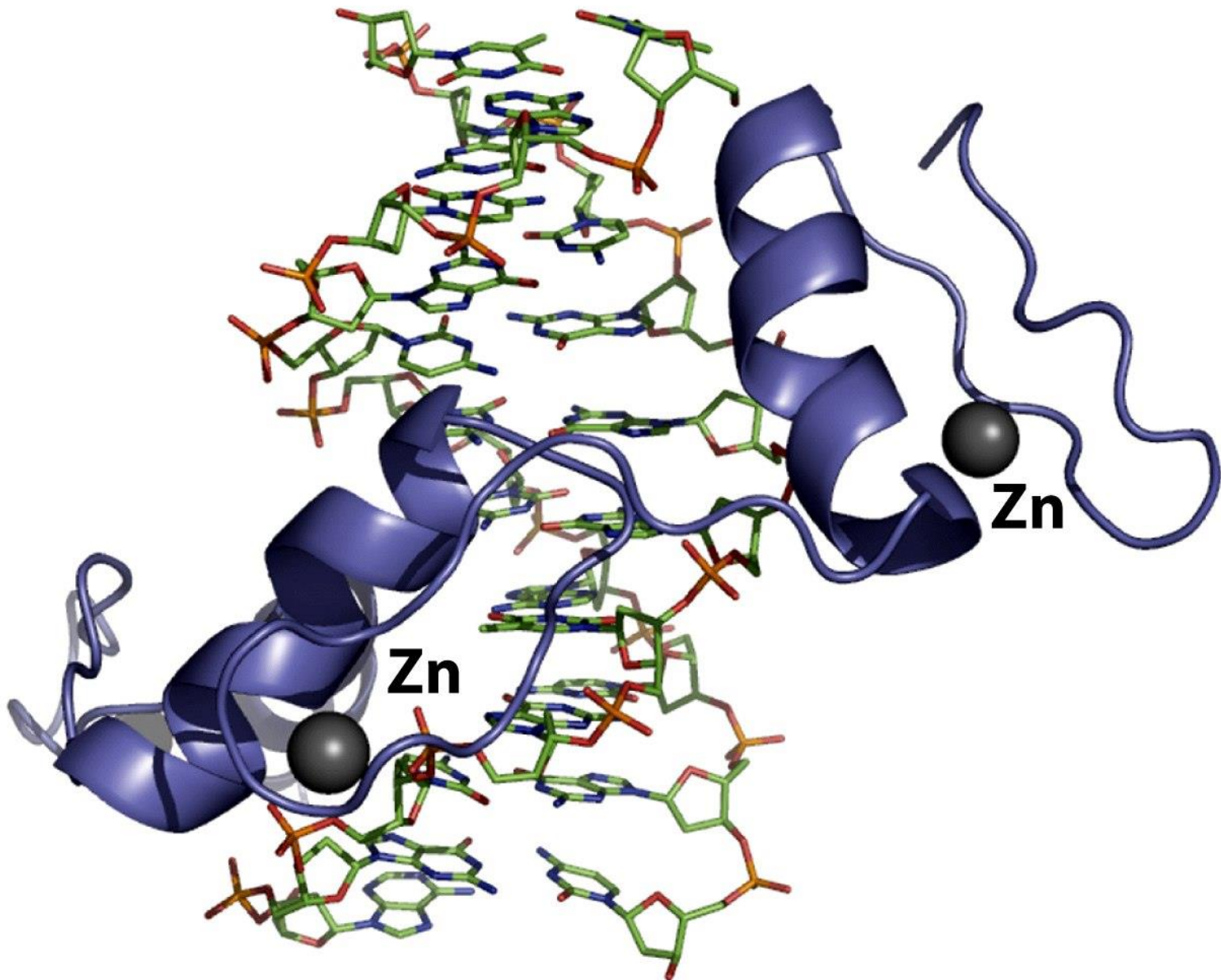


Zinc fingers



gene regulatory proteins e transcription factors





Interazione di zinc-fingers con DNA