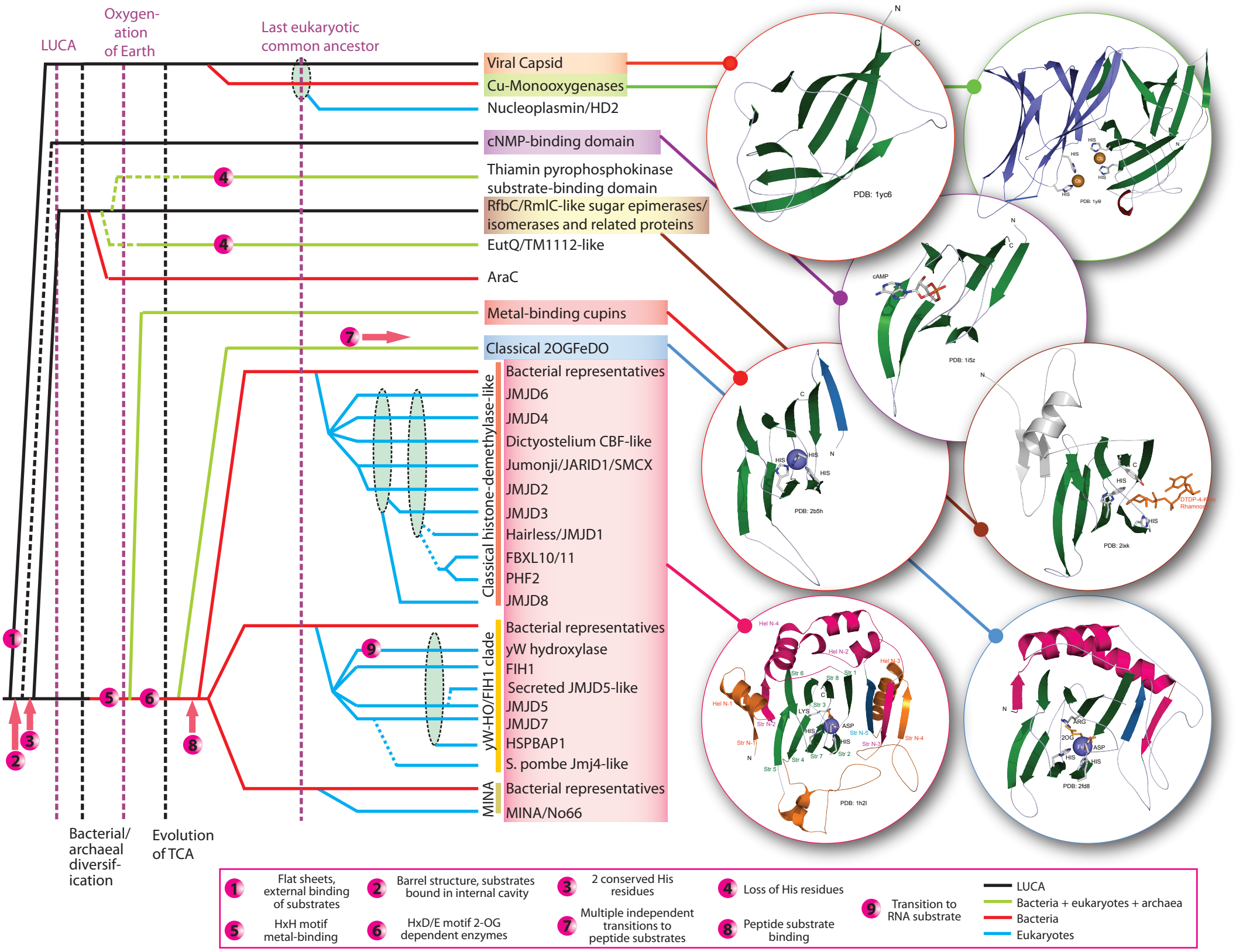
LUCA
Oxygen-ation of Earth
Last eukaryotic common ancestor
Viral Capsid
Cu-Monooxygenases
Nucleoplasmin/HD2
cNMP-binding domain
Thiamin pyrophosphokinase substrate-binding domain
RfbC/RmlC-like sugar epimerases/ isomerases and related proteins
EutQ/TM1112-like
AraC
Metal-binding cupins
Classical 2OGFeDO
Classical histone-demethylase-like
Bacterial representatives
JMJD6
JMJD4
Dictyostelium CBF-like
Jumonji/JARID1/SMCX
JMJD2
JMJD3
Hairless/JMJD1
FBXL10/11
PHF2
JMJD8
yW-HO/FIH1 clade
Bacterial representatives
yW hydroxylase
FIH1
Secreted JMJD5-like
JMJD5
JMJD7
HSPBAP1
S. pombe Jmj4-like
MINA
Bacterial representatives
MINA/No66
Bacterial/ archaeal diversif-ication
Evolution of TCA
PDB: 1yc6
PDB: 1yi9
PDB: 1i5z
PDB: 2b5h
PDB: 2ixk
PDB: 1h2l
PDB: 2fd8
1 Flat sheets, external binding of substrates
2 Barrel structure, substrates bound in internal cavity
3 2 conserved His residues
4 Loss of His residues
5 HxH motif metal-binding
6 HxD/E motif 2-OG dependent enzymes
7 Multiple independent transitions to peptide substrates
8 Peptide substrate binding
9 Transition to RNA substrate
LUCA
Bacteria + eukaryotes + archaea
Bacteria
Eukaryotes