Finding of a new family of NAD(P)H-dependent oxidoreductases with no Rossmann-fold.

The Overall structure of Δ¹-piperideine-2-carboxylate (Pip2C)/Δ¹-pyrroline-2-carboxylate (Pyr2C) reductase from Pseudomonas syringae (left) is distinct from that of a typical Rossmann-fold enzyme, malate dehydrogenase from Escherichia coli (right). α-Helices and α-sheets are shown in red and blue, respectively. NADP+ (left) and NAD+ (right) molecules are in green.

The new NAD(P)H-dependent oxidoreductase family proteins which have no Rossmann-fold were classified into eight clades. Pip2C/Pyr2C reductase belongs to the DpkA clade in the new family. This classification would be useful for reliable functional annotation of the new family of NAD(P)H-dependent oxidoreductases.