

Structure of a Class 4 aldo/keto Reductase

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Plants produce at least three types of class 4 aldo/keto reductases (AKR), of which two have been assigned a specific enzymatic activity: polyketide reductases (class 4A) and codeinone reductases (class 4B). The *in-vivo* substrate for class 4C AKRs is not known, but the presence of class 4C enzymes have been correlated with drought resistance, and genes and EST for class 4C AKRs are found in most plants [1]. Barley aldose reductase is a class 4C AKR sharing app. 40% sequence identity with codeinone and polyketide reductases. We here present the structure of barley aldose reductase, the first structure of a class 4 aldo/keto reductase and experimental identification of the anion binding site.

Barley aldose reductase is a 320 amino acid NADPH containing enzyme. It shares the AKR TIM barrel fold with other AKR family members, but the substrate binding site defined by the A to C loops is substantially different from previously described binding sites. Sequence identity between barley aldose reductase and codeinone and polyketide reductases indicates that the structures of the substrate binding loops are very similar amongst class 4 AKRs.

[1] Oberschall A., Deák M., Török K., Sass L., Vass I., Kovács I., Fehér A., Dudits D., Horváth G.V., *Plant J.*, 2000, **24**, 437.

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