

Protein Kinase CK2 in Human Diseases

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Protein kinase CK2 (formerly referred to as casein kinase II) is an evolutionary conserved, ubiquitous protein kinase. There are two paralog catalytic subunits, i.e. alpha (A1) and alpha' (A2).

The alpha and alpha' subunits are linked to two beta subunits to produce a heterotetrameric structure.

The catalytic alpha subunits are distantly related to the CMGC subfamily of kinases, such as the Cdk kinases. There are some peculiarities associated with protein kinase CK2, which are not found with most other protein kinases: (i) the enzyme is constitutively active, (ii) it can use ATP and GTP and (iii) it is found elevated in most tumors investigated and rapidly proliferating tissues. With the elucidation of the structure of the catalytic subunit, it was possible to explain why the enzyme is constitutively active [1] and why it can bind GTP [2].

Considerable information on the potential roles of CK2 in various disease processes including cancer has been gained in recent years, and the present review may help to further elucidate its aberrant role in many disease states. Its peculiar structural features [3-9] may be advantageous in designing tailor-made compounds with the possibility to specifically target this protein kinase [10].

Since not all the aspects of what has been published on CK2 can be covered in this review, we would like to recommend the following reviews; (i) for general information on CK2 [11-18] and (ii) with a focus on aberrant CK2 [19-22].