

Novel Bi-Functional Alpha-Kinases Protein Kinases linked to Ion Channels

Background

There is one well-characterized superfamily of protein kinase: serine/threonine/tyrosine protein kinases. These kinases phosphorylate amino acid residues located in the loops or turns of their substrates. Several other protein kinases have been documented that lack homology to this superfamily of kinases. Recently a new class of kinases called alpha kinases that does not have any homology to the serine/threonine/tyrosine protein kinase superfamily has been identified. Eukaryotic Elongation Factor 2 Kinase (eEF-2) belongs to this second family of kinase. The alpha kinases differ from serine/threonine/tyrosine protein kinases in that they phosphorylate a threonine amino acid residue located in the alpha helical region of the substrate.

The present invention relates to the discovery and characterization of additional members of the family of the alpha kinases that are related to the eEF-2 kinase but possess certain unique characteristics. The characterization of additional members has both therapeutic and diagnostic implications for diseases associated with cell cycle progression and malignant transformation.

Description of the Technology

A new superfamily of eukaryotic protein alpha kinases has been discovered. Genes for tissue specific alpha kinases such as melanoma alpha kinase, heart alpha kinase, skeletal muscle alpha kinase and lymphocyte alpha kinase have been identified, cloned and sequenced. These kinases do not reveal sequence homology to the well-characterized serine/threonine/tyrosine superfamily. However, they reveal partial homology to eEF-2 alpha kinases. In addition, these kinases were found to possess certain unusual characteristics not found in other kinases. In particular, a subfamily of bifunctional alpha kinases was discovered and found to contain an ion channel covalently linked to the catalytic domain of the protein kinase. The presence of an ion channel linked to the kinase molecule is indicative of self-regulation of the molecule and suggests a phosphorylation mechanism that is distinctive from previously characterized mechanisms. Further, the ion-channel portions of melanoma and kidney kinase share over 70% homology to the metastasis suppressor gene coding for metastatin.

Applications

- . •To generate antibodies (monoclonal or polyclonal) to the kinases
- . •As drugable targets for cancer and other malignancies
- . •To develop pharmaceutical drug screening assays
- . •To treat medical conditions requiring modulations of alpha kinase activities.
- . •To diagnose medical conditions with altered alpha kinase activities
- . •To modulate ion channels through the development of new immunomodulators.

Deliverables

- . •Clones expressing the channel kinases
- . •Vectors encoding the channel kinases

Patent Status

- United States patent application filed.
- Patent application was published on November 28, 2002 (Publication No.: US 20020177205 A1)

Licensing Opportunity

- This technology is available for non-exclusive or exclusive license.

Contact

Peter Golikov, MS, MBA
Director, Ventures and Licensing
University of Medicine and Dentistry of New Jersey
335 George Street
New Brunswick, NJ 08901
Direct Phone: (732)-235-9355
Main Office Phone: (732)-235-9350
Facsimile: (732)-235-9358
golikope@umdnj.edu