Expression, Purification, And Isolation Of The Full Length Human Breast Cancer Susceptibility Gene 2 (Brca2) Protein

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ABSTRACT

Method for expression, purification, and isolation of the full length human breast cancer susceptibility gene 2 (BRCA2) protein.

FULL DESCRIPTION

Mutations in the breast cancer susceptibility gene BRCA2 are associated with about half of all cases of familial (highly hereditary) breast and ovarian cancer. Because of this high correlation, the presence of mutated BRCA2 is the subject of certain genetic tests marketed to breast and ovarian cancer patients. But until now, scientists have been unable to successfully express and isolate the full length BRCA2 protein encoded by the gene.

Researchers at the University of California, Davis have developed a method to successfully express and purify the full-length BRCA2 protein from human cells. BRCA2 cDNA was cloned into a CMV driven mammalian expression vector and expressed and purified from human embryonic kidney cells (HEK-293T) using a tandem repeat of the maltose binding protein (MBP) tag located at the N-terminus of the protein for affinity purification. The purification of this protein from human cells allows for proper post-translational modifications and folding resulting in a protein that can be isolated in quantities unattainable previously.

This, in turn, will allow for far more sophisticated study of how the BRCA2 protein functions in the cell. Functional BRCA2 protein is thought to play a role in repairing damaged DNA, but further study has been difficult without a way to reliably express a high yield of biochemically functional BRCA2 protein. This new method overcomes those problems and will allow for the development of a variety of research and commercial uses.

APPLICATIONS

- Make antibodies and other reagents for use in testing kits
- Screen for drugs that activate or inhibit the interaction between BRCA2 and DNA repair machinery
- Study how various mutations in the BRCA2 gene affect the BRCA2 protein function

FEATURES/BENEFITS

- Allows the user access to the full length protein
- Proper post-translational modification of the protein
- Proper folding of the protein
- Substantial increase in the yield of biochemically functional protein
- Overcomes problems associated with full length expression including:
  - Protein insolubility

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OTHER INFORMATION

KEYWORDS

BRCA, BRCA-2, BRCA2, Breast, Ovarian

CATEGORIZED AS

- **Biotechnology**
  - Genomics
  - Health
  - Proteomics
- **Materials & Chemicals**
  - Biological
- **Medical**
  - Diagnostics
  - Disease: Cancer
  - Disease: Women's Health
  - Gene Therapy
  - Research Tools

- Protein degradation
- Low yields

RELATED MATERIALS

- Jensen RB, Carreira A, and Kowalczykowski SC, Purified human BRCA2 stimulates RAD51-mediated recombination, Nature, 467(7316):678-83 (2010 Oct 7): - 10/07/2010
- Protein made by breast cancer gene purified - 08/22/2010

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,150,897	10/06/2015	2010-576

- Screening
- Therapeutics
- **Research Tools**
- Antibodies
- Nucleic Acids/DNA/RNA
- Reagents
- Screening Assays

RELATED CASES

2010-576-0

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