THE UNIVERSITY OF CHICAGO | Genetic Services Laboratories

Testing for Mutations of *BRCA1* and *BRCA2*

Clinical Features and Molecular Genetics:

A woman has an 11-12% lifetime risk of developing breast cancer, and a 1% lifetime risk of developing ovarian cancer. Most cases of breast or ovarian cancer are sporadic; however, 5-10% of breast and ovarian cancers are hereditary. Two breast cancer susceptibility genes have been isolated, *BRCA1* and *BRCA2*, with germline mutations in these genes accounting for the majority of families with hereditary breast and/or ovarian cancer. The presence of a mutation in either *BRCA1* or *BRCA2* will increase an individual's lifetime risk of developing cancer to 60-85%.

The genes for *BRCA1* and *BRCA2* are located on chromosome 17 and chromosome 13, respectively. The hereditary forms of cancer due to mutations in *BRCA1* and *BRCA2* follow an autosomal dominant pattern of inheritance, meaning that an individual who has a mutation has an increased risk of developing cancer and a 50% chance of passing the gene to each of his or her children.

The Ashkenazi Jewish population has been found to have two common mutations in the *BRCA1* gene (185delAG and 5382insC) and one common mutation in *BRCA2* gene (6174delT). It is believed that these three mutations account for 26% of the mutations for breast and/or ovarian cancers in the Ashkenazi Jewish population (1). An incidence of 2-3% for one of these three common mutations has been identified in the general Ashkenazi Jewish population (2).

The University of Chicago Genetic Services Laboratories provide mutation analysis for the three common mutations found in the Ashkenazi Jewish population, as well as other known mutations in the *BRCA1* and *BRCA2* genes (Customized Diagnostics). Because of the complexity of testing for hereditary cancers, laboratory verification of any previously identified mutation in a family is required before carrier testing can be performed on any relative at risk for carrying the mutation.

We will only perform testing within the context of genetic counseling prior to testing to discuss the sensitive issues surrounding presymptomatic testing and again following testing to discuss the implications of results. Please contact laboratory staff for information regarding cancer risk clinics in your area.

Testing for familial BRCA1/BRCA2 mutations

Sample specifications:	3 to10 cc of blood in a purple top (EDTA) tube
Cost:	$500
CPT codes:	81215
Turn-around time:	3 weeks

Testing for 3 founder mutations of BRCA1/BRCA2 in Ashkenazi Jews

Sample specifications:	3 to10 cc of blood in a purple top (EDTA) tube
Cost:	$500
CPT codes:	81212
Turn-around time:	3 weeks

Results:

Results, along with an interpretive report, will be faxed to the referring physician. Additional reports will be provided as requested. All abnormal results will be reported by telephone or email.

For more information about our testing options, please visit our website at dnatesting.uchicago.edu or contact us at 773-834-0555.

References:

1. Krainer M, Silva-Arrieta S, FitzGerald MG et al. Differential contributions of BRCA1 and BRCA2 to early-onset breast cancer. N Engl J Med 1997: 336: 1416-1421.
2. Struewing JP, Hartge P, Wacholder S et al. The risk of cancer associated with specific mutations of BRCA1 and BRCA2 among Ashkenazi Jews. N Engl J Med 1997: 336: 1401-1408.

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