

Researchers: Rachel Rompala, Kaitlyn Barnes, & Cameron Vannoy

Topic: Breast cancer related to ovarian cancer

Question:

- Determine the relatedness between the RNA transcribed from BRCA1/2 in breast and ovarian tissue tumors.
 - Determine the significance of the relatedness

Links to Data Set and Original Study:

- <https://www.ncbi.nlm.nih.gov/geo/query/acc.cgi?acc=GSE141142>
- <https://pubmed.ncbi.nlm.nih.gov/32164626/>

Proposed methods:

1. Download dataset from <https://www.ncbi.nlm.nih.gov/geo/query/acc.cgi?acc=GSE141142>.
2. Convert data to fasta format using Galaxy.
3. Determine alignment scores
4. Find parsimony informative sites
5. Complete a heuristic search
6. Bootstrap analysis
7. Use majority rule tree and parsimony informative sites to determine tree score
8. NJ analysis
9. Bayesian analysis

Introduction:

Breast and Ovarian cancers affect millions of women across the United States every year. In 2021, over 43,600 women are expected to pass away from breast cancer and over 13,900 women will pass away from ovarian cancer ("Breast Cancer Statistics"), ("Ovarian Cancer Statistics"). As women, we recognize that these cancers represent huge health risks to ourselves and our peers, so we have chosen to examine the phylogenetic relationship between ovarian and breast cancer tumors. Over the years, early detection of these cancers has resulted in a 40% decrease in mortality rate (National Breast Cancer Foundation). Early detection can be aided by a knowledge of the genetic basis of cancer. We hope to determine if the transcripts of BRCA1/2 display a phylogenetic relationship. We plan to determine this using tools covered in this class.

This course has provided us with the knowledge and tools to compare these two cancer's BRCA1/2 transcripts at a molecular level. We will be able to explore the relatedness through heuristic searches, bootstrapping analysis, the construction of neighbor-joining trees, and Bayesian analysis.

GitHub Link: https://github.com/vannoycm/EEOB563_FinalProject

Bibliography

- National Breast Cancer Foundation. "Breast Cancer Statistic." *nationalbreastcancer.org*, National Breast Cancer Foundation, 15 April 2020, <https://www.nationalbreastcancer.org/breast-cancer-facts>. Accessed 28 March 2021.
- "Ovarian Cancer Statistics." *Ovarian Cancer Research Alliance*, Ovarian Cancer Research Alliance, 2021, <https://ocrahope.org/patients/about-ovarian-cancer/statistics/>. Accessed 28 March 2021.
- Przbytkowski, Ewe, et al. "An immune-centric exploration of BRCA1 and BRCA2 germline mutation related breast and ovarian cancers." *BMC Cancer*, 2020. *PubMed*, <https://pubmed.ncbi.nlm.nih.gov/32164626/>. Accessed 28 March 2021.
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