

Cancer Genomics Assignment

Cancer Type: Breast Cancer

Table: Genes/Proteins Associated with Breast Cancer and Their PDB Structures

| Gene Symbol | Protein Name | Cancer Type | PDB Structure Available | Representative PDB ID |
|--------------|--|---------------|-------------------------|-----------------------|
| BRCA1 | Breast Cancer Type 1 Susceptibility Protein | Breast Cancer | Yes | 1JM7 |
| BRCA2 | Breast Cancer Type 2 Susceptibility Protein | Breast Cancer | Yes | 1MIU |
| TP53 | Tumor Protein p53 | Breast Cancer | Yes | 2OCJ |
| ERBB2 (HER2) | Receptor Tyrosine-Protein Kinase erbB-2 | Breast Cancer | Yes | 3PP0 |
| PIK3CA | Phosphatidylinositol 4,5-Bisphosphate 3-Kinase Catalytic Subunit Alpha | Breast Cancer | Yes | 3HHM |
| ESR1 | Estrogen Receptor Alpha | Breast Cancer | Yes | 1ERE |
| PGR | Progesterone Receptor | Breast Cancer | Yes | 1A28 |
| PTEN | Phosphatase and Tensin Homolog | Breast Cancer | Yes | 1D5R |
| CDH1 | Cadherin-1 (E-cadherin) | Breast Cancer | Yes | 2O72 |
| ATM | Ataxia Telangiectasia Mutated Serine/Threonine Kinase | Breast Cancer | Yes | 5NP0 |

| Gene Symbol | Protein Name | Cancer Type | PDB Structure Available | Representative PDB ID |
|-------------|--|---------------|-------------------------|-----------------------|
| CHEK2 | Checkpoint Kinase 2 | Breast Cancer | Yes | 2CN5 |
| PALB2 | Partner and Localizer of BRCA2 | Breast Cancer | Yes | 4IJ9 |
| AKT1 | RAC-Alpha Serine/Threonine-Protein Kinase | Breast Cancer | Yes | 3CQW |
| GATA3 | GATA Binding Protein 3 | Breast Cancer | Yes | 3DFV |
| MAP3K1 | Mitogen-Activated Protein Kinase Kinase Kinase 1 | Breast Cancer | Yes | 3FHR |
| CCND1 | Cyclin D1 | Breast Cancer | Yes | 2W96 |
| MYC | Myc Proto-Oncogene Protein | Breast Cancer | Yes | 1NKP |
| EGFR | Epidermal Growth Factor Receptor | Breast Cancer | Yes | 1M17 |
| RB1 | Retinoblastoma-Associated Protein | Breast Cancer | Yes | 2QDJ |
| FGFR1 | Fibroblast Growth Factor Receptor 1 | Breast Cancer | Yes | 1FGK |

Resources Used

Databases

- 1. RCSB Protein Data Bank (PDB):** Structural data and PDB IDs were retrieved from <https://www.rcsb.org/>.

2. **UniProtKB:** Protein nomenclature and functional confirmation were sourced from <https://www.uniprot.org/>.
3. **GeneCards:** Disease-gene associations were identified via the Human Gene Database <https://www.genecards.org/>.
4. **The Human Protein Atlas:** Protein expression data in breast cancer tissue was cross-referenced at <https://www.proteinatlas.org/>.
5. **NCBI Gene:** Official gene symbols and genomic information were verified at <https://www.ncbi.nlm.nih.gov/gene>.