**Exercise 5**

**Cancer Genomics**

This section will focus on Databases and tools of Cancer genetics. Cancer is caused by irregularities in transcription that is mostly due to somatic and germline mutations. Databases such as COSMIC and TCGA contain millions of somatic mutations that occur in Cancer patients.

**(a) COSMIC (Catalogue of Somatic Mutations in Cancer)**

COSMIC database can be accessed at:

<https://cancer.sanger.ac.uk/cosmic>

This database is the largest source of manually curated somatic mutation information relating to human cancers. Experts have curated mutation data from peer reviewed paper and thousands of Genomes. COSMIC is divided into several distinct projects and two of them are listed below

1. **COSMIC:** The core of COSMIC, an expert curated database of somatic mutations. It also has germline information.

Query the BRCA1 gene in database and note down number of mutations on your answer sheet.

2. **Cancer Gene Census (CGC):** This list is an ongoing effort to catalogue and describe all genes with causal impact in human cancer. It can be accessed at:

<https://cancer.sanger.ac.uk/census>

Search any type of Cancer in CGC list and note number of genes involved in that cancer type

**(b) TCGA (The Cancer Genome Atlas)**

It is an comprehensive and coordinated effort to enhance our understanding of Cancer at molecular level through application of genome analysis technologies. TCGA network researchers have developed several computational tools and some of them are listed below

1. The Cancer Imaging Archive (TCIA)

It can be accessed at <https://www.cancerimagingarchive.net/>

2. cBioPortal for Cancer Genomics

It can be accessed at <http://www.cbioportal.org/>

3. FASMIC (Functional Annotation of Somatic Mutations in Cancer)

It can be accessed at <https://ibl.mdanderson.org/fasmic/#!/>

4. The Cancer Proteome Atlas Portal (TCPA)

It can be accessed at <https://www.tcpaportal.org/>