

Content Evaluation and Tool Development for Knowledge Management System

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1. BACKGROUND

- Colorectal cancer / bowel cancer :
 - The 2nd most common cancer in Ireland.
 - Linked to accumulation of multiple genetic & epigenetic changes.
- Epigenetic changes:
 - Additional regulatory layer on top of (but not connected to) genetic information stored in DNA sequence.
 - Reversible and heritable.
- We are working on :
 - Knowledge Management system (see below) to explore the role of genetic and epigenetic factors in human cancers.

4. WHY IS KMS IMPORTANT?

- It elucidates the underlying mechanisms of genetic and epigenetic alterations in human cancers.
- It explore prospects for novel early diagnostic tools and therapeutic interventions.
- Enhances knowledge sharing in scientific community.

3. WHAT DOES KMS DO?

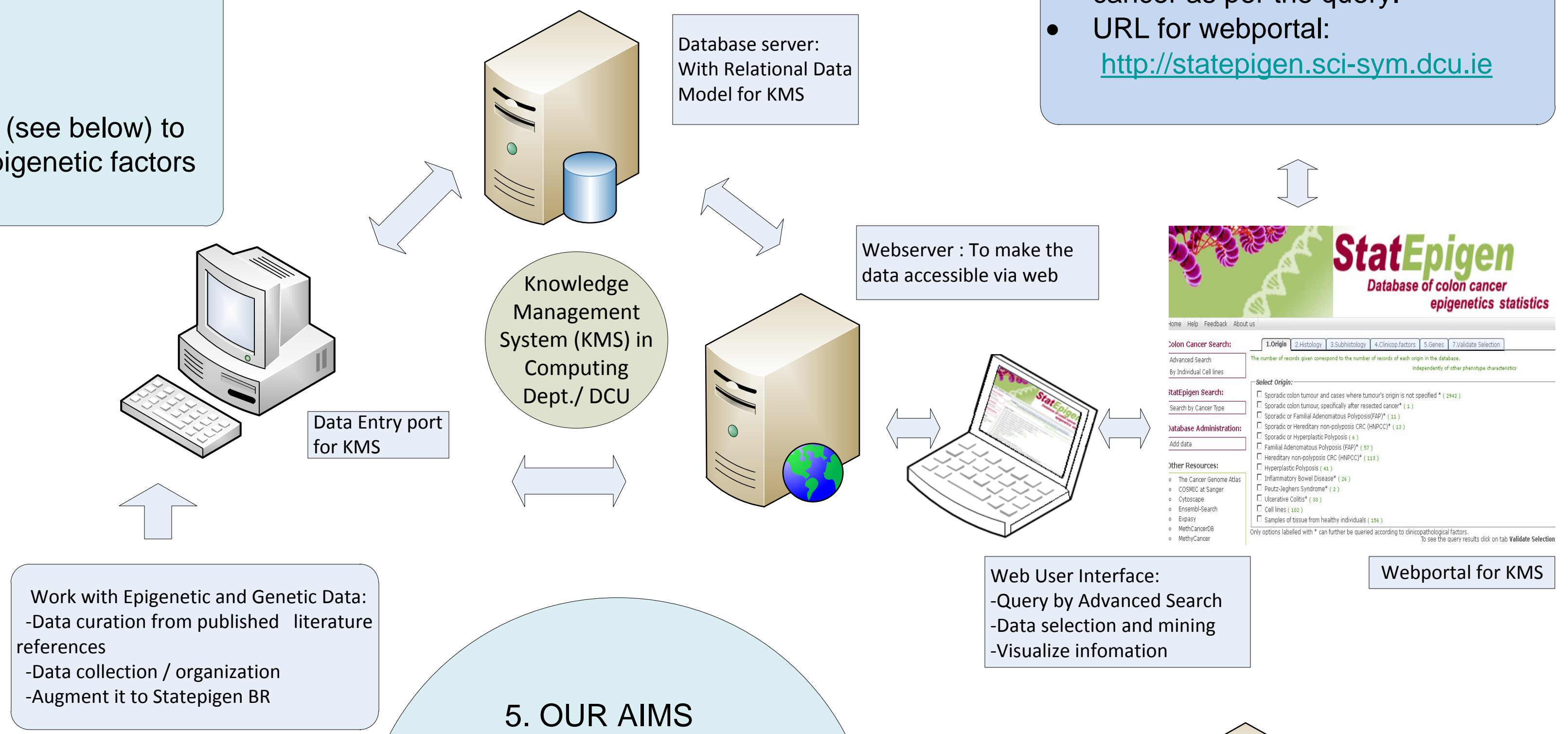
- Additionally, provides access to annotated information through a query, data visualisation and integration interface.
- Provides statistically analyzed output for different stages of colon cancer as per the query.
- URL for webportal: <http://statepigen.sci-sym.dcu.ie>

2. CRC: WHO ARE AT RISK?

- Consumers of high fat, low fibre diet.
- Overweight and obese individuals.

Individuals with :

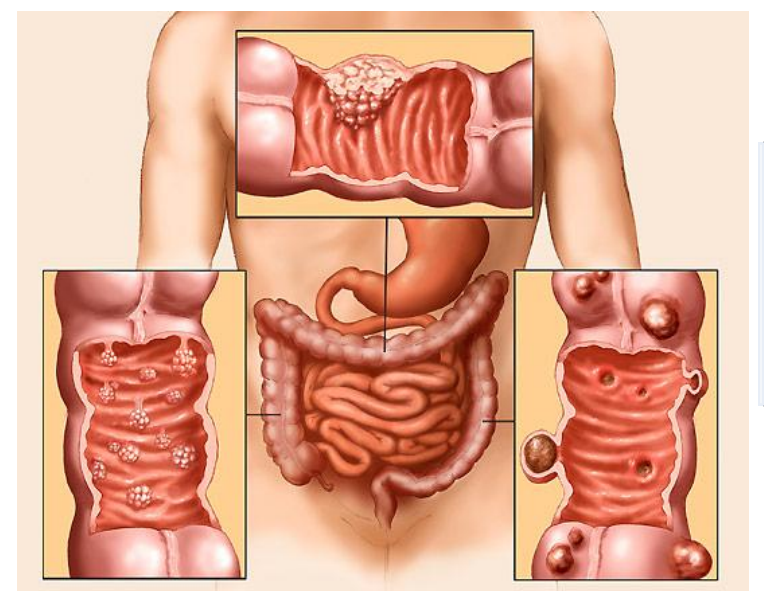
- Previous occurrence of bowel cancer.
- Immediate family member with a history of bowel cancer or FAP or HNPCC.
- A history of bowel conditions like ulcerative colitis or Crohn's disease.



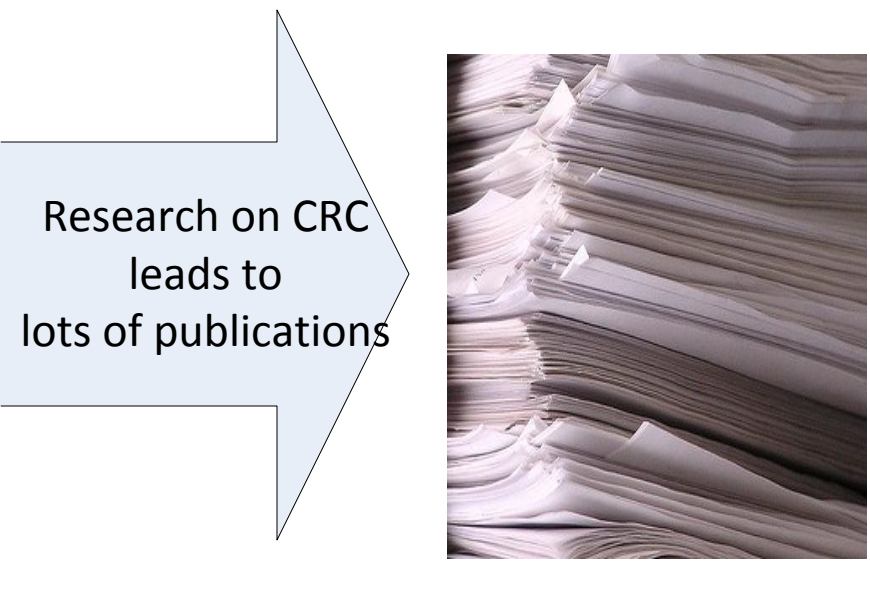
5. OUR AIMS

(a) Augmentation, Analysis and Upgrade of KMS/ Biomedical Resource (As shown above)

(b) Evolutionary Analysis to answer if human and mouse colon cancer genes still similar-functionally (As per below)



CRC (Colorectal Cancer)



Research on CRC leads to lots of publications

Colon cancer's stages

Colon cancer is one of the most common types of cancer. It is very treatable, if caught early. Stages of a tumor and risk factors:

Stage 0 Cancer has not grown beyond inner layer of colon wall

Stage 1 Grown to outer layer of wall

Stage 2 Tumor is through wall, not spread to lymph nodes

Stage 3 Spread to lymph nodes

Stage 4 Cancer spreads to distant sites in body, such as liver or lung

How tumor begins

- Normal tissue forms a polyp projecting from colon wall
- Over time, polyp becomes a tumor

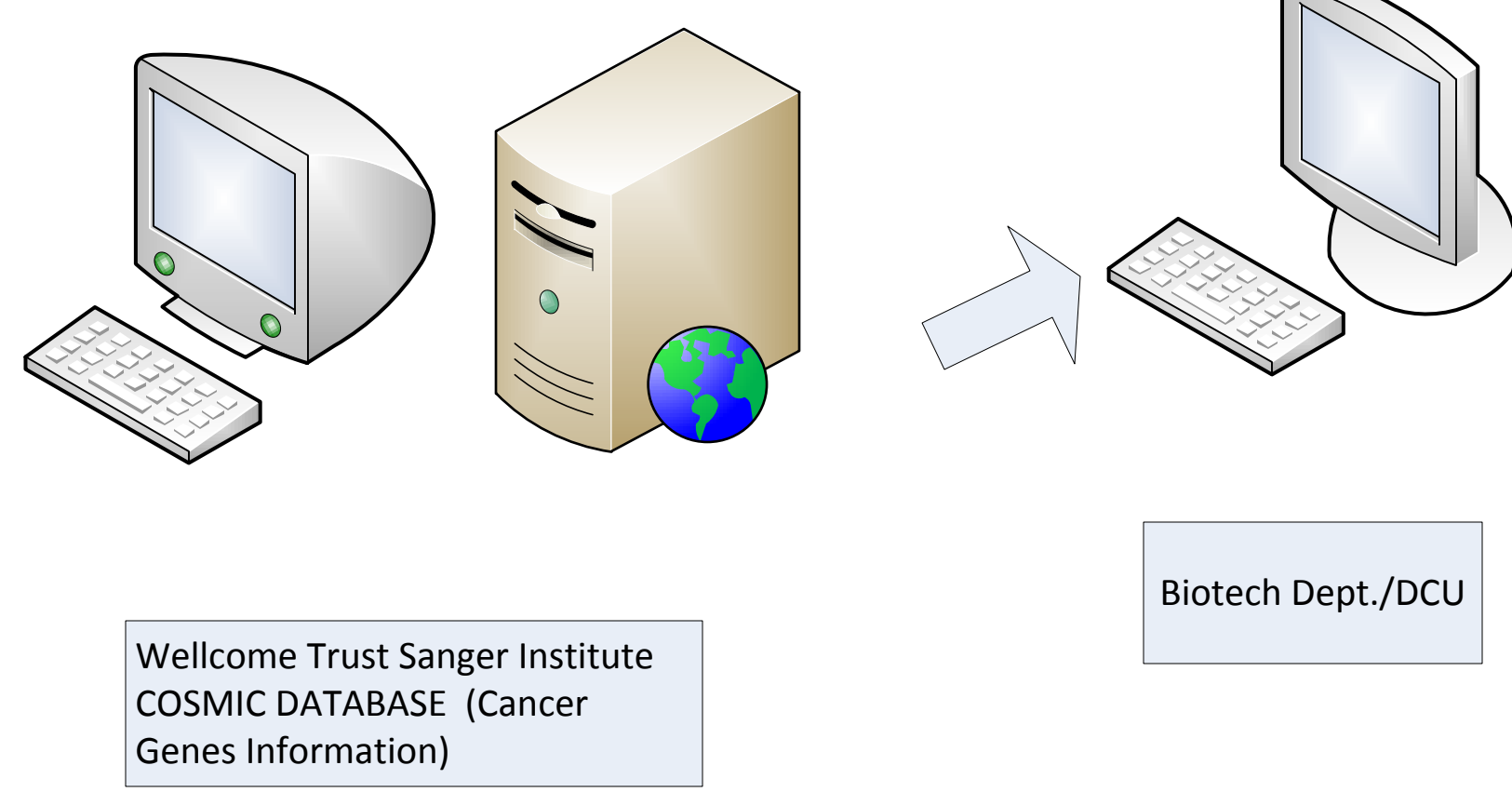
Risk factors

Age, family history of colon cancer, patients with ulcerative colitis or Crohn's disease

CRC Stages

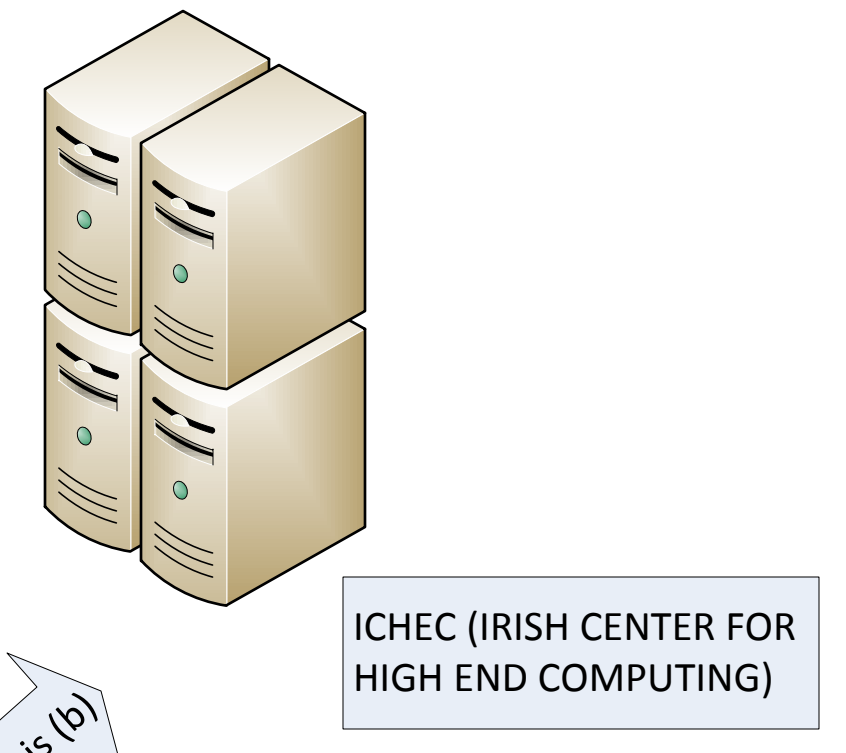
GLOSSARY

BR – Biomedical Resource
 CRC – Colorectal Cancer
 KMS- Knowledge Management System
 FAP – Familial Adenomatous Polyposis
 HNPCC – Hereditary Non-Polyposis Colon Cancer

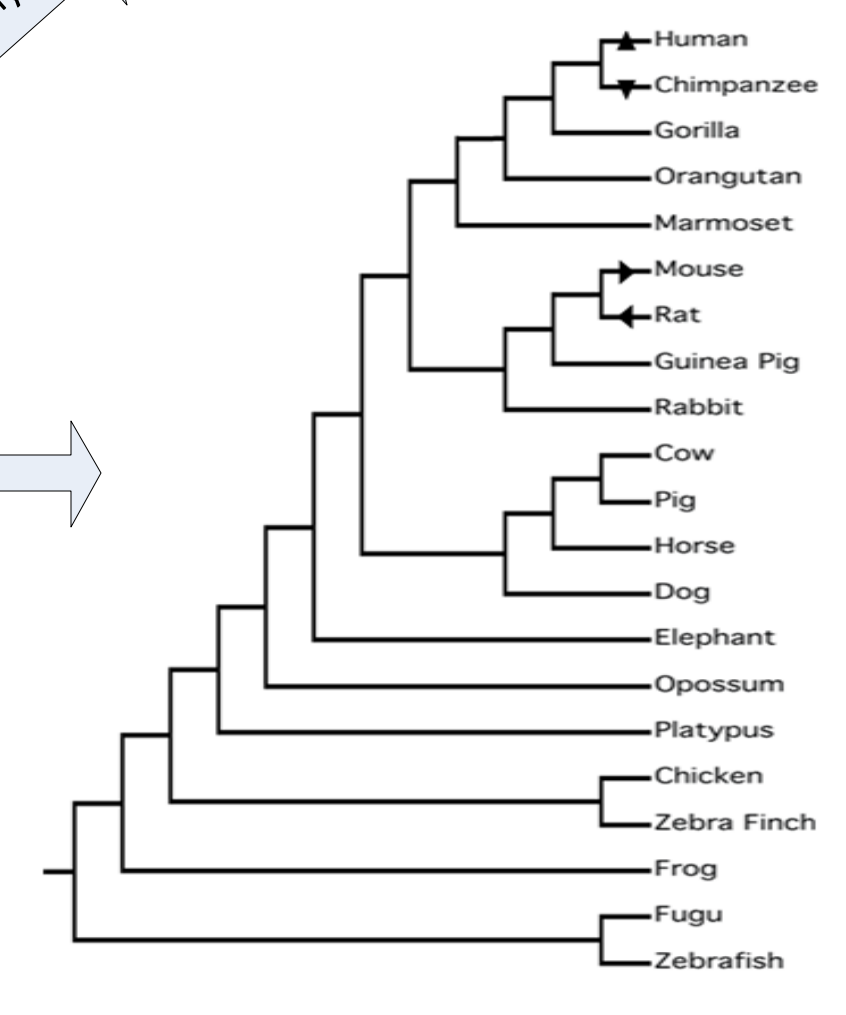


Wellcome Trust Sanger Institute COSMIC DATABASE (Cancer Genes Information)

Biotech Dept./DCU



ICHEC (IRISH CENTER FOR HIGH END COMPUTING)



A phylogenetic tree showing different vertebrates as branches, the genes of which were analysed in our analysis, carried out in Biotech Dept.

6. WHERE ARE WE AT NOW?

- In addition to above, we are currently looking at new possibilities for upgrade of KMS.
- A survey of complementary resources is completed as well (A Paper is to be published soon).
- For the study on whether mouse and human genes are still similar functionally, we found that some genes are not (Details on BMC Evol. Biology paper).

7. FUTURE WORKS

- A new approach / pipeline for integrating more data to the system is to be devised for overall system upgrade.
- There are many other possibilities for linking our KMS to other similar resources – which are being looked at.
- Extend the work to other cancer types as well.