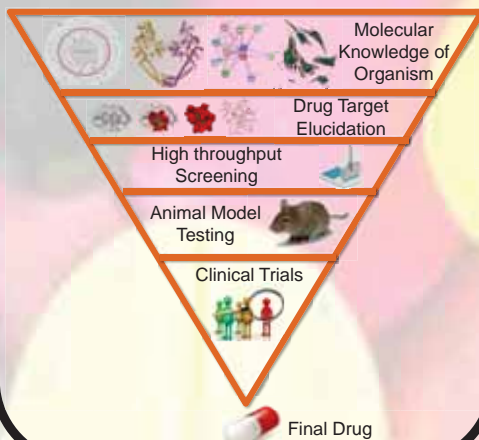


# EVOLUTION: BASIC SCIENCE TO DRUG DISCOVERY

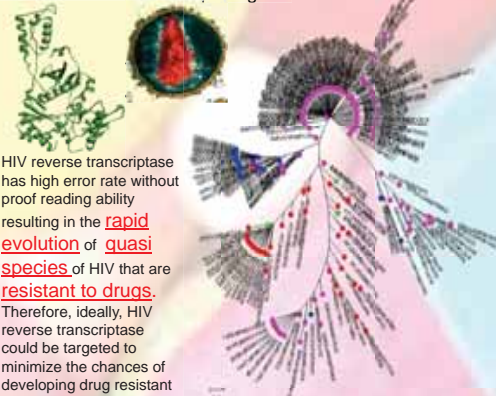
For long time, Evolution was considered as a subject of basic science. However, in the light of expansion of genomics and proteomics data, it is now increasingly evident that understanding of **Evolution** is immensely insightful in the process of **Drug Discovery and Designing**

## Drug Discovery and Development



## Targeting Evolution

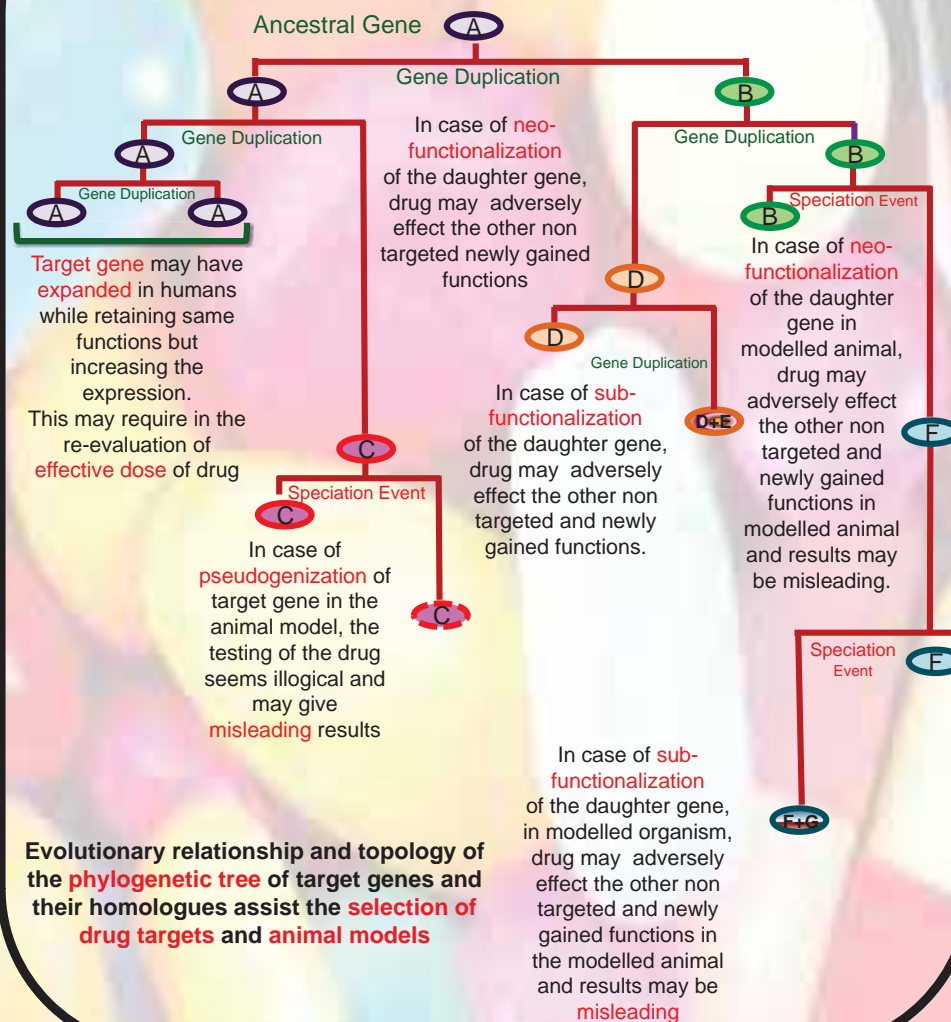
Tendency to evolve is one of the major denominator to increase the fitness of the organism including pathogens



Rozera et al., 2009. *Retrovirology*. 6:15

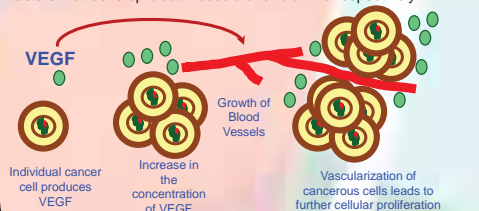
## Molecular Evolution and Drug Designing

Characteristics of **molecular evolution** of target genes and/or proteins could have noticeable impact for their suitability as drug target. **Lets Explore Why?**



## Selection and Drug Designing

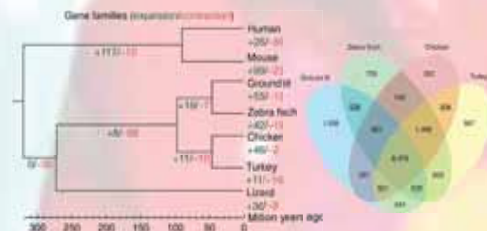
Evolution produces strategies for the survival of not only a single cell/member of species but also favour social networking and altruism also referred to as **group selection**. **Cancerous cells** and many **bacterial pathogens** use the same strategy of group selection to ensure their survival by producing factors that develop **blood vessels** and **biofilms** respectively



Factors responsible for group selection could be good drug targets

## Gene Families Evolution and Drug Designing

Testing drugs in animal models is vital to their development. Since **Genes** undergo **Expansion** and **Contractions** during the course of **Evolution** it is important to consider it before selecting animal models.



Qu et al., 2012. *Nature Communication*. 4:2071

Expansion of gene families since the emergence of reptiles

**For drugs targeting human bio-molecules, such animal should be chosen where the respective gene expansion is comparable to humans**