Luxury and HouseKeeping Gene :

⇒ In eukaryotic cells, it seems that certain classes of genes are transcribed more or less continuously, and only in Extreme situations their activities are Repressed.

⇒ For Example, genes coding For Larger ribosomal RNA (28S or 18S rRNA) or Transfer RNA (tRNA) are present as multiple copies forming simple multigene Family.

⇒ These genes are transcribed uniquely by RNA Copies forming polymerase I For The Larger ribosomal RNA or by RNA polymerase III For tRNA and 5S RNA Although The products of some of these genes, The Ribosomes, are used continuously in all cells, it does not confirm that all of these multiple copies are continuously transcribed at maximum Rate.

⇒ Electron micrographs of spread chromatin from nucleoli often show that in the some of The Repetitions rRNA genes are inactive.

⇒ It is also true that in the nucleated erythrocytes of lower vertebrates such as xenopus, all genes may be turned off (Ma clean et al. 1972),

Including those for ribosomal RNA and t RNA.

⇒ Therfore, It is clear that mechanisms do exist for inactiving sequences even those Regraded to be constitutive in normal cells.

⇒ some of the clearest domonstrations that some specific genes are at least available for Transcription in different kinds of differentiated cells are provided by drosophila and other organisms.

⇒ For Example the pattern of bands and interbands of polytene chromosomes of Drosophila does not very between different Larval tissues, yet it is now cadduced that they are expressed in every cell, and that they are Retained in a state of permanent decondensation (Bautz and Kabisch, 1983).

⇒ Thus 'housekeeping' genes may be 'left on' for much of the life the cell when transcription of even the most essential housekeeping gene cases (ie. during mitosis).

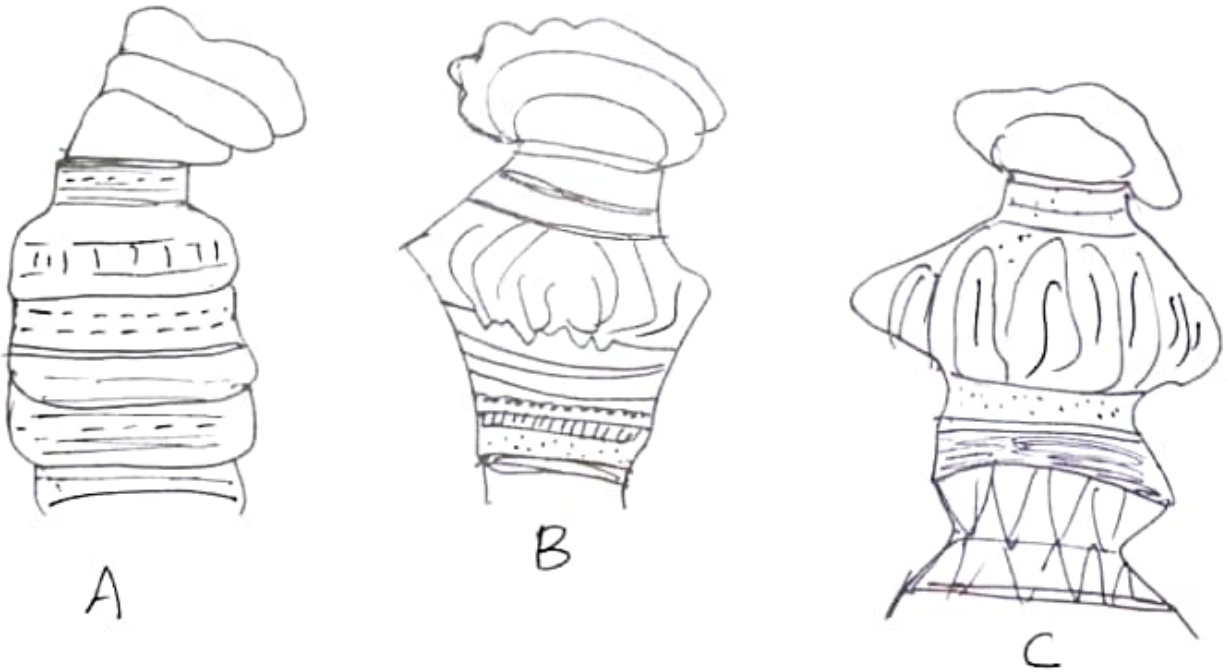
⇒ Further, when we consider the case of the "cell-specific" genes, luxury genes or smart genes, which code for the produts only found in specilised Tissues, it becomes immediatly clear that differential Expression is the Rule.

⇒ whether Expression for gene is measured at the level of the messenger RNA or the protein, genes coding for products such as globin, crystallin fibroin, Ovalbumin, casein and immunoglobulin give every indication of complete repression in all but the specialized tissue characterised by their presence.

⇒ Thus, at the Level of genome (i.e .. DNA), The following five modes of Regulation are operative; (in situation of total genetic shutdown.

⇒ (a) During mitotic phase of the cell cycle, chromatin in highly condensed to form chromosomes, and transcriptional activity of all genes is suspended.

⇒ (b) During meiotic division of germ cells a somewhat similar situation to (a) is evident, although in some Rare case, such as lampbrush chromosomes of meiotic diplotene in vertebrates (Vlad, 1983), Transcription proceeds very actively.

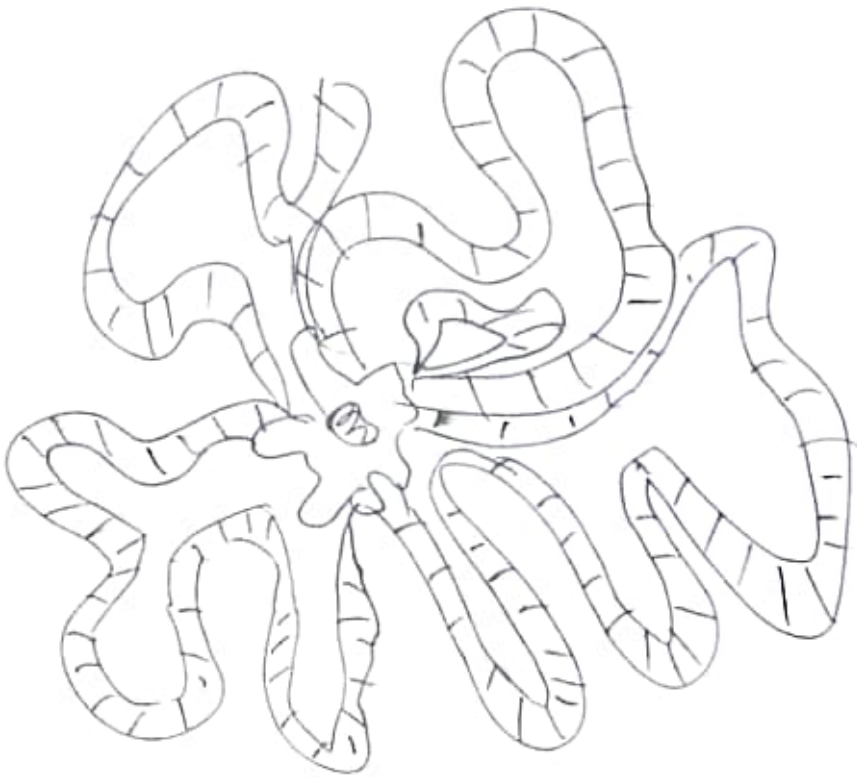


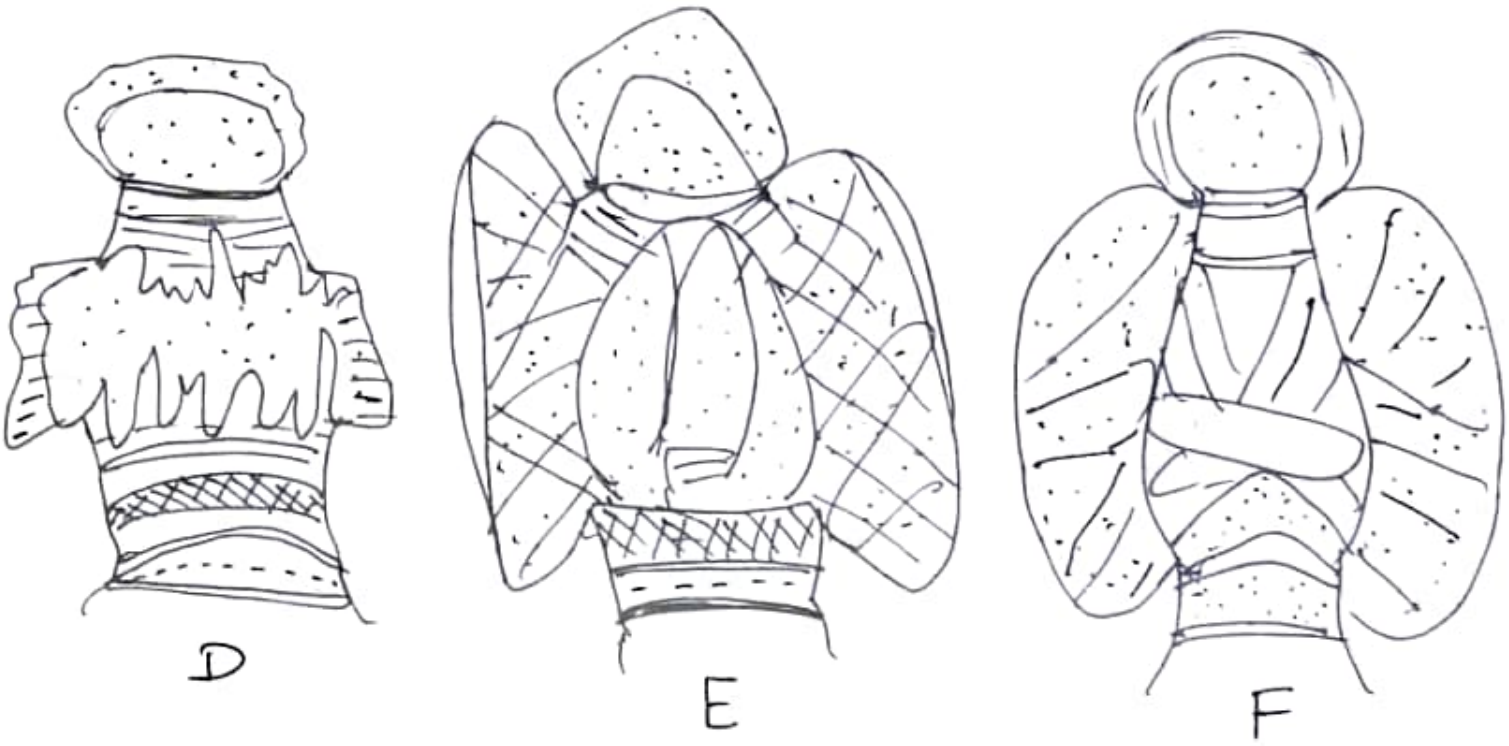
⇒(i) complete suspention of Transcriptional activity is also known in the following cases.

⇒cells of some plant seeds; cells within diapausing Artemia gastrulae; cells within inactive organisms such as desiccated Tardigrada; nuclei within bacterial and fungal spores; and nuclei within desiccated Amoeba cells, as for example in the slime mould Dictyostelium.

⇒(ii) Evidence for constitutive expression of some genes.

⇒(a) If the interbands of Drosophila polytene chromosomes are correctly interpreted as being loci for "housekeeping" genes, Then the evidence is that such chromatin is permanently decondensed and is Transcribed at a low but constant Rate (Semeshin et al. 1979).





⇒ The development of a chromosomal puff in a salivary cell nucleus of Cironomous tentans.

⇒ (c) The nucleus of mature nucleated erythrocytes of Amphibians is transcriptionally inactive chromatin in these cells is highly condensed but not organised into discrete chromosomes (Chegini et al. 1981).

⇒ However, Transcription can be partially Reactivated in these nuclei by Transferring them into new cytoplasm or exposing them in vitro to altered environmental conditions.

⇒ (d) In Mammalian females, one of the two X chromosomes present in somatic cells undergoes condensatio in early embryonic stages to become heterochromatic sex chromatin or Barr Body (Dosage compensation).