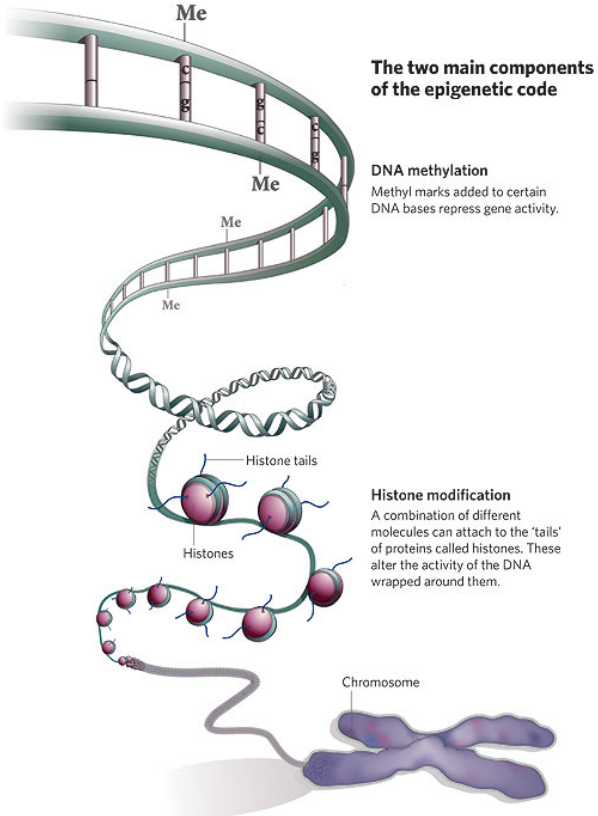
## HYPARCHIC REGULATION

JGB was well aware of the Scholastic-Aristotelian scheme of Form and Matter. Form was responsible for everything we could recognise; it was the very foundation of intelligibility. Matter by itself was pure stuff with no constraints or limits, therefore unknowable and incomprehensible. One of the first acts of Form was to endow Matter with the attribute of quantity. Form extends up into the angelic realm of pure form (disputed by some scholars such as Avecibron who insisted that angels were material too). The idea of Form raises questions about its detail. Does everything that exists have its own individual form, or even a form that is specific to the passing moment? We can think of an organism that is constantly changing *within certain limits* and suppose that these limits are its form, akin to what we know as the *species.*

The theologian Duns Scotus proposed that each individual had its *haecceity* or 'thisness' that made it 'this particular thing'. This was distinguished from its *quiddity* its 'whatness' or species or essence. We may venture to suppose that Duns Scotus' haecceity is akin to hyparxis and introduces something that is not included in the concepts of Form and Matter, an in-between factor that is the basis of individuality and freedom.

Since the discovery of genetics there has been discussion and argument over how it is that the 'same' (or very similar) genetic code can result in a variety of expressions in individual cases. There is, for example, the popular nature v nurture debate. Clearly, interaction with the environment has an effect on how an organism develops. Pollution can damage and stunt growth. Let us picture the genetic code as 'form' on the one side and the impact of the environment (e.g.in food and air, climate and kinds of stress) as 'matter' on the other. What is it that operates between these?




In biology it has long been recognised that the genes per se are not the whole story and a major role is played by the *expression of genes* that is, by information that switches the genes on and off (epigenetic). Spectra of possibilities may lie dormant in the DNA because they are not expressed, brought into the life of the organism, at all. If DNA is like code or a language then there is also the 'reading' of this language which then translates into biochemical action. Between the DNA and the 'world' so to

say there may lie a whole range of regulative mechanisms. For advanced organisms such as humans and mammals this may include *perception* of the world (sensitivity) and even consciousness.

In the DU hyparxis reconciles eternity and time and, in particular, in organisms it is postulated that there is in operation a *hyparchic regulator.* We link eternity with Form and time with Matter and then, again, link them with DNA and environmental pressures respectively. It may be useful to think of a very simple mechanical example. Imagine a reservoir of water which is a source of potential energy existing in eternity. Picture an opening in the barrier holding back the waters. There will be different effects according to the size of the opening. If it is big as the barrier there is a total sudden collapse and destruction follows. If it is very small then only a trickle gets through. With the right size there can be a flow of water using for doing work, as in the working of a mill from a flowing stream. Now imagine that the system can take energy from its environment (feed) such that it can pump the water back into the reservoir. The opening and the pumping operations provide simple pictures of what hyparchic regulation might involve.

An interesting development in modern genetics has been the discovery that the human genome contains far *fewer* genes than was anticipated. Indeed the human species is characterised by how much is *missing* from its set of genes. This suggests that a bigger role is being given to the hyparchic regulator in us. Remember, too, that hyparchic regulation extends into our psychological and social life such that what we are doing to ourselves through technology is part of hyparchic regulation. This is a big topic and includes speculations that we have, for example, latent archaic forms of mind (perception) that are inhibited in order to allow the expression of other potentialities. It is remarkable how reading and mathematics could arise when nothing could have anticipated them.

JGB often seems to suggest that his hyparxis is ‘free choice’ disguised in various ways, or expressed in varying degrees. We cannot change what we are (in eternity) nor the world (as it impacts us in time) but we can choose *to act* differently.

**Appendix**

Chan Ho Song and Michelle Wyse (August 2004) http://www.scq.ubc.ca/painless-gene-expression-profiling-sage-serial-analysis-of-gene-expression/

With the advent of the human genome project, a vast amount of information about genes and gene structure is suddenly at our fingertips. But this information is limited. Every cell within an organism has the same genetic composition (with the exception of its gametes), and yet, obviously skin tissue is very different from nervous tissue. The DNA sequence cannot provide information about these differences, which represent the next level of complexity and organization within an organism: DNA expression. Cells within a multicellular organism, such as ourselves, specialize to perform specific functions to increase the efficiency of the organism. Nerve cells, or neurons, express neuron-specific proteins that allow it to perform neuron duties. Skin, or epithelial cells, have their own specific proteins that enable their

protective functioning. Both neuron and epithelial cell have the genes encoding for neural- and epithelial-specific proteins, but each cell only expresses the genes that it requires, and not other tissue-specific genes (Figure 1). In this way, a given DNA sequence only provides information about what could be, not what actually is.

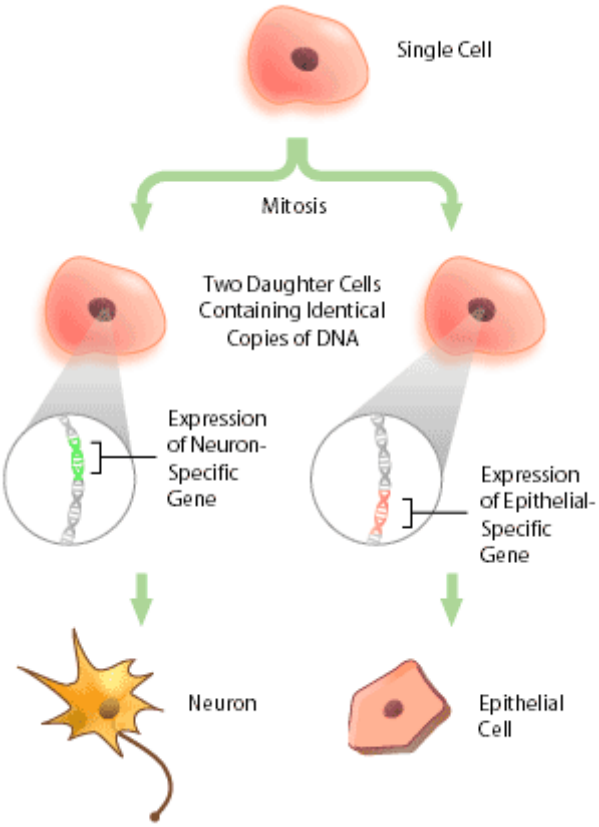



***Figure 1. Differential gene expression is responsible for the morphology of different cells.*** *All cells within an organism have the same DNA, but not all genes are expressed. An epithelial cell will express only genes specific to skin, whereas a neuron will express genes necessary for its development.*

**What Exactly is DNA Expression?**

DNA expression refers to the study of how specific genes are transcribed at a given point in time in a given cell. A gene is transcribed into a messenger RNA (mRNA) transcript when the protein that is encoded by the gene is required by the cell. This occurs because DNA located in the nucleus, but all of the machinery necessary for translation, or producing proteins, resides in the cytoplasm. The cell resolves this problem by creating a copy of the gene (mRNA) that is capable of entering the cytoplasm through the nuclear pores. By examining which transcripts are present in a cell, it is possible to deduce which genes (and their related proteins) are expressed in a cell type, and at what time these are expressed.

In the past, DNA expression studies typically looked at only a few transcripts at any one time, due to the limitations of the techniques available [1]. But in recent years several new techniques have been developed that enable large scale studies of DNA expression; these can be used to create ‘expression profiles’. An expression profile is a characterization of the

relative quantity of every transcript that is produced in any one cell type. One technique that has been used to generate expression profiles is SAGE (Serial Analysis of Gene Expression).