# ggressive"

from the morality of a religious person. From the beginning humans are equipped with the potential for empathy, to feel for other humans. Like anger and rage, compassion and love are also part of our make-up. These qualities are built into our genes. Christians believe that love is the biggest gift God gave to humans. And in principle this is correct. Our potential to sympathise with other humans is the basis of all social order. We are able to love because evolution made us into social creatures.

**Spiegel:** Could we find human rights in our genes?

**Watson:** I do not believe in human rights. I believe in human duties and responsibility. What should human rights look like? Where should these come from? We surely have no right to health or nutrition. We could wish for it, and we could need it. But to have a right to something means earning it. Rights can only originate from interaction between humans. In contrast to this it is assumed human rights come from God, not alterable but absolute. But this is not correct. Rights are by no means part of human nature.

**Spiegel:** According to nature, life is exclusively and eternally a battle.

**Watson:** Correct. That's what it is, a battle.

**Spiegel:** And your life? Has this also been a permanent battle?

**Watson:** Certainly. Perhaps not quite so when I have a good meal in front of me.

**Spiegel:** Does this continuous battle make one happy?

**Watson:** No. It creates anxiety, big anxiety.

**Spiegel:** And it does not create happiness?

**Watson:** Of course, if you win. Happiness is the reward for success. The few moments of happiness must be paid for with many moments of anxiety. This is also true in science. One is happy if you understand something. After the discovery of the DNA structure we were happy. But not for long. Then it became clear. We would only be happy again if we understood RNA.

**... of scientific progress:**

**Spiegel:** Scientific progress is continuing unhappiness, interrupted by a few moments of happiness?

**Watson:** Let's say science is the continuous search for happiness.

**Spiegel:** What are you currently looking for? New happiness?

**Watson:** When I was at the White House after the announcement of the human genome I was asked by journalists: 'Why aren't you smiling?' I answered: 'We can't cure cancer yet.'

**Spiegel:** It is cancer more than any other disease that shows the shortcoming of genetics and molecular biology. How many times was a breakthrough promised? How many times was victory announced? And how many successes can molecular medicine present in its favour?

**Watson:** When it comes to our understanding, cancer is a success story. Now we have to turn our understanding into benefits for the patient.

**Spiegel:** But how long will this take? Will you still experience it?

**Watson:** Well, what kind of life expectancy Twelve years? I am seventy five. □

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James Watson
(Picture: Associated Press)

# he double helix discovery

range of questions of interest to the study of organisational behaviour, such as issues of leadership, creativity and personal motivation. And his students have certainly responded well to the account, he pointed out.

"The last two times that I've used it, they've come back asking for re-screenings."

## Chromatin and histones – the next level of the DNA story

How DNA compacts: Assoc Prof Hugh Patterton's research looks at the role of histone H1 in regulating gene expression.

Associate Professor Hugh Patterton's laboratory in the Department of Molecular and Cell Biology is conducting what the IIDMM's interim director, Professor Wieland Gevers, refers to as the "next level of the story" as far as DNA is concerned,

This deals with the structure of nucleosomes, rolled up bits of DNA, and special proteins called histones, which appear as beaded chains in the chromosomes within the nucleus.

"Patterton did his PhD under Emeritus Professor Claus von Holt, who, with Deneys van der Westhuyzen and others in the 1970s, found ways of preparing the functional histone proteins, which allowed the determination of the structure of nucleosomes elsewhere," Gevers wrote.

It was an achievement highlighted by many flattering references in the standard *Scientific American* article on nucleosomes.

The formation of nucleosomes plays a vital role in making the DNA sufficiently compact to fit in the cell nucleus. In order to fit 46 DNA molecules (in humans) totalling over 1m in length into a nucleus that may only be 10 micrometres across, requires extensive folding and compaction.

The linker histone H1 is indispensable in this series of condensations, which results in a 10 000-fold lengthwise compaction of the genetic molecule, enabling the DNA to fit into the cell nucleus. More specifically, Patterton's research focuses on the role of histone H1 in regulating gene expression in baker's yeast *(Saccharoyces cerevisiae)*.

Chromatin, the nuclear material that contains the genetic code, is an extremely topical and important area of study as it has a well-established repressive effect on the biochemistry of DNA. "It can mask the molecule from enzymatic and regulatory complexes that require access to the DNA for normal genetic functioning."

The repressive effect of chromatin has been associated with X-chromosome inactivation, recombination, DNA replication and transcriptional regulation.

"The regulatory role of chromatin has been clearly demonstrated in several human genetic diseases, including myotonic dystrophy (an inherited disorder in which the muscles contract but have decreasing power to relax), leukaemogenesis and multiple myeloma (cancer of the bone marrow), in which improper chromatin structural transitions and nucleosome associations have been implicated."

## DNA is art

Dr Fritha Langerman with her reconstruction of DNA.

*Lexicons & Labyrinths – the iconology of the genome* is a Human Sciences Research Council sponsored exhibition currently on at the South African Museum. It seeks to explore new kinds of collaboration between art and science and allows artistic commentary on the human genome initiative.

Showcasing the work of eight national artists, including Michaelis School of Fine Art lecturers Fritha Langerman and Professor Malcolm Payne, as well as part-time lecturers Lien Botha and Nadja Daehnke, the exhibition performs an educational role in making many facets of the Africa Human Genome Initiative accessible to local audiences as well as making interesting connections between art, science and representation.

Finding a visual analogy to describe the unseen and looking for equivalents in order to explain what cannot be efficiently described in words, Langerman has produced an eight metre long strip of illuminated objects made from pharmaceutical packaging.

Her work is concerned with the 50-year anniversary of Watson and Crick's DNA model.

According to Langerman, analogy is a system that seeks similarity through difference and is a means of visualising the unseen or indescribable.

Langerman describes the use of analogy in describing the genome as partly an attempt to deal with the "analogy of the text" and the "semiotic relationship between the genetic code and its expression as image – how the body is signed by its text".

"The exhibition is about examining the iconography of the genome, how it has and may be constructed and what implications this may have in the future," said Langerman. □