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Huzzah To The Double Helix! It's International DNA Day

CHRIS JAGER YESTERDAY 9:30 AM

Today is International DNA Day, which this year commemorates 60 years since the scientific paper *A Structure for Deoxyribose Nucleic Acid* was first published. Here's what some of Australia's leading scientists have to say about the importance of the discovery...

DNA picture from Shutterstock

Sixty years ago to the day, James Watson and Francis Crick published a revolutionary paper on the structure of Deoxyribonucleic acid; the molecular key to all living things otherwise known as DNA. A century after Gregor Mendel first began messing about with peas, the final piece of the genetic puzzle had been slotted into place.

To mark this historic occasion, several Australian scientists have released statements in which they basically wax lyrical about the wonders of DNA — what better way to start your morning? (And if you're wondering what the Lifehacker angle is, the answer is quite simple: when someone smarter than you has something to say, it's usually worth listening!)

Professor Suzanne Cory, President of the Australian Academy of Science:

> The discovery of the structure of DNA by James Watson and Francis Crick was an epic moment in the history of science. The elegant DNA double helix has rightly been deemed 'the Mona Lisa of modern science'. In making this discovery, Watson and Crick drew together diverse findings from many scientists, particularly Maurice Wilkins, who shared their Nobel prize, and Rosalind Franklin, whose premature death robbed her of adequate recognition.
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> Watson and Crick were driven by a deep passion to understand how genes encode the process of life. However, in 1953, I doubt even they could have imagined how many surprises the four letters of the genetic code (GTAC) encrypted – split genes, jumping genes, vast tracks of apparent 'junk' DNA that conceal a complex web of regulatory signals. Nor could they have envisioned the power of the genetic revolution they unleashed. A mere 60 years later, we know the complete genetic blueprint of hundreds of organisms, including ourselves, and this knowledge is transforming our understanding of evolution, development, physiology and disease, leading to remarkable advances

in medicine.

On a personal note, it was learning about DNA at university that inspired me to become a scientist. I wrote to Francis Crick asking whether he would take me on as a PhD student and, to my amazement, he said yes. The time I spent in his department at the famed MRC Laboratory of Molecular Biology in Cambridge marked me indelibly. I learned that science is a vocation, not just a job, and requires total commitment. One has to ask the big questions and be engaged full force. Nothing less will do.

Professor Jerry Adams, Joint Head of the Molecular Genetics of Cancer Division at the Walter and Eliza Hall Institute of Medical Research:

The structure of DNA unveiled 60 years ago by James Watson, Francis Crick and colleagues transformed biology. Its two beautiful intertwined helices revealed how the genetic information is copied and passed to offspring. Amazingly, the structure suggested that our entire development is detailed in a DNA code with a four-letter alphabet. Cracking this code became the Holy Grail of the new science of molecular biology, which soon established that our genes were DNA segments comprising blueprints for our thousands of proteins. In 1962 I joined this exciting endeavour in Jim Watson's lab at Harvard through PhD studies that revealed the universal start signal for each protein. The deciphering of the 'Genetic Code' in the late 1960s was a milestone. My post-doctoral studies in Cambridge, England in 1969 helped to validate this Rosetta Stone of biology by determining the first sequence of letters in a gene for a known protein.

Today, DNA science and its impact on medicine are breathtaking. The herculean 'Human Genome Project' to establish the sequence of the three billion letters in our DNA, completed in 2003, took thousands of scientists a decade and cost billions of dollars. Now, however, robotic machines speed-read the DNA from a patient's blood or tumour in hours, soon for only a thousand dollars, revealing the many 'typos' within our DNA that can cause cancer and birth defects. Increasingly, a patient's DNA sequence guides treatment and will soon allow estimates of disease risks to enable preventive measures.

Dr Dennis McNevin, Assistant Professor of Forensic Studies in the Faculty of Education, Science, Technology and Mathematics at the University of Canberra:

The use of DNA has revolutionised the field of forensic science and has become the "gold standard" of forensic evidence. The discovery of highly individualised parts of DNA by Alec Jeffreys in 1985 has allowed us to confidently associate people with the minute quantities of DNA they leave behind. Trace quantities of DNA can now be retrieved from touched objects and resulting DNA profiles can link a perpetrator to a crime scene. DNA has even resulted in the exoneration of innocent but wrongfully incarcerated people as a result of the re-examination of "cold cases" using new, highly sensitive DNA profiling techniques.

The field of forensic science is about to undergo another breakthrough with the use of DNA to predict a person's physical appearance. Eye-witness accounts are notoriously unreliable but the "silent witness" of DNA is not effected by fading memories or incomplete recollections. We are already able to accurately predict the eye and hair colour of a person from their DNA. We soon hope to be able to produce a "molecular photofit" of anybody who leaves DNA at a crime scene. This will help focus valuable police resources when there are no suspects or a very large pool of suspects.

Professor Graeme Suthers, Head of the SA Clinical Genetics Service, Genetics & Molecular Pathology Directorate at SA Pathology, Women's & Children's Hospital, Adelaide:

60 years ago, James Watson and Francis Crick discovered the structure and code of our genes. This breakthrough paved the way for our current understanding of the genetic basis for many diseases, both common and rare, that place a burden on our lives, our families, and our communities. The same discovery led to the development of medical genetic tests which can help patients and their families better manage the diseases and risks which they face. However, it is troubling that 60 years after this key discovery, there are major inequities in the delivery of medical genetic testing across Australia.

There is currently no national framework for the delivery of testing; genetic tests are done at very different rates across the country, and the funding for these genetic tests is unfair. The contribution that patient payments make to genetic tests varies from 5 percent to 50 percent of the costs of testing in different States. After 60 years, Australia should be able to do better than this.

Professor Ian Charles, Director of the ithree institute at the University of Technology Sydney:

What a journey of discovery the last 60 years has been; what exciting innovations we have made; and what knowledge still lies ahead to be revealed. Unravelling the secrets of microbial genomes was the first area to benefit from the DNA and genome revolution – the first whole genomes sequenced were for RNA viruses and DNA phage in the 1970s, followed by the whole-genome of a

bacteria in 1995 and the draft human genome just six years after that.

Today, with the ability to sequence multiple microbial genomes in a day, we are making important breakthroughs in our understanding of the complexity of the 'microbiome' (that is entire microbial populations) and the vital role that bacteria play – not just in disease but, more importantly, in health. Being able to read the DNA code is providing vital insight into the mechanisms by which bacteria become resistant to drugs – and this is helping us to address the challenge that antibiotic-resistant bacteria pose to modern medicine.

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Matthew J Guest *APRIL 25, 2013 12:18 PM*

Today is **ANZAC** day. DNA can find its own bloody day.

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howling @howling *APRIL 25, 2013 6:51 PM*

Er, that would be 'International' DNA Day...

LAST EDITED APRIL 25, 2013 6:52 PM

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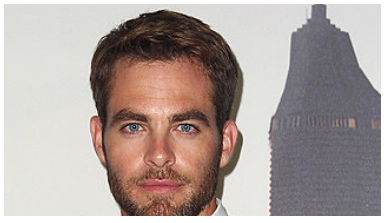

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