Media Statement

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2016 Ian Constable Lecture: "Junk" DNA as the key to human development

The Australian scientist who challenged 50 years of genetic theory on the role of RNA - or "junk DNA" - will deliver this year's Ian Constable Lecture.

Professor Mattick, head of Sydney's Garvan Institute of Medical Research, will address the topic: *The central role of RNA in human evolution and development* next **Thursday, December 1** at The University of Western Australia.

"The human genome - the DNA that we inherit from our forebears - is extraordinarily complex," Professor Mattick said.

"What was dismissed as junk because it was not understood almost certainly holds the secret to understanding human development and cognition, as well as many complex diseases."

RNA (Ribonucleic Acid) is one of the three essential building blocks of life found in all cells, along with DNA and proteins. Proteins are required for the structure, function and regulation of the body's tissues and organs. DNA carries the genetic information that specifies the proteins, with RNA (a temporary copy of the gene) being the intermediate between the two.

But in the 1970s, scientists made the surprising discovery that only a small proportion of the human genome actually specifies proteins, and quickly dismissed the other 98 per cent of the DNA as "junk".

"The other surprising discovery, flowing from the genome sequencing projects at the turn of this century, was that the human genome contains only 20,000 protein coding genes, similar in number and function as those found in relatively simple life forms

like tiny nematode worms. This means that the protein parts set for animal biology is very similar," Professor Mattick said.

"By contrast, the extent of non-protein-coding DNA rises with increasing developmental and cognitive complexity – reaching 98.5 per cent in humans. Moreover, this DNA is copied into RNA in very specific patterns during development.

"These RNAs function at many different levels of gene expression, including translational control and guidance of epigenetic processes that underpin development, physiological adaptation and brain function.

"So the key difference between a nematode of a thousand cells and a human with a hundred trillion cells is the RNA regulatory superstructure. RNA is not only the computational engine of human development and cognition, but perhaps also of evolution itself."

Professor Mattick won the prestigious Human Genome Organisation's Chen Award in 2012 for his work on non-coding RNA.

He was recently named by the National Health and Medical Research Council as one of the all-time high achievers in Australian health and medical research and by Thomson Reuters as one of the world's most influential scientific minds.

Entry to the 2016 Ian Constable Lecture, from 6pm to 7pm, is free.

RSVP online at www.ias.uwa.edu.au/lectures/mattick

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