

WHAT MAKES HUMAN BRAIN SO UNIQUE IN THE ANIMAL KINGDOM

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Understanding the developmental and evolutionary mechanisms, by which the human brain has become so uniquely different from the chimpanzee brain within a period of 5-6 million years, still remains largely unknown. Human brain evolution is characterized by a dramatic increase in brain size and specialization of different areas of cerebral cortex, along with the presence of a distinctive class of neuronal populations, known as spindle neuron. Comparative functional genomics approach reveals that a protein-coding region of the human genomic DNA may not play any significant role behind the unique features of human brain development. On the other hand, the rapidly evolving, non-coding segments of the human genome, containing a set of 49 “human accelerated regions” (HARs) have been characterized playing prominent role in human brain development. Of the 49 HARs, HAR-1, which is the fastest evolving segment and is part of a novel RNA coding gene, HAR-1F, is considered to hold the secret of what makes the human brain so different from the brains of chimpanzee and other mammals.
