ANTHROPOLOGY NEWS DIARY

(AND)

10.07.2021

FOR UPSC CSE MAINS

This series provides compilation of daily CURRENT AFFAIRS of Anthropology.

It is aimed at addressing the requirement of aspirants to add contemporary aspects of the subject to the answers.

It also helps in understanding the trends of anthropology across India and the world.

**NOTE:** Please attempt the questions given at the end of the document and can upload on the [telegram channel: Sosin for Anthropology Q&A](https://t.me/sosinforanthropologyqa), for peer review.
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Note - For convenience, the respective reference links have been dropped at the end of every topic.
A. BIOLOGICAL ANTHROPOLOGY
   1. Teeth of Cretaceous period Sharks in Iron Age Site
   - An international team of archaeologists has found multiple fossil shark teeth within Iron Age cultural layers dating to 8-9th century BCE in Jerusalem, Israel.
   - These fossils are not in their original setting, so they have been moved.
   - The fossil teeth are approximately 80.3 million years old (Late Cretaceous epoch), and belong to several shark species, including the extinct Late Cretaceous group Squalicorax.
   - “Squalicorax, which grew to between 2 and 5 m (6.6-16.4 feet) long, lived only during the Late Cretaceous, so acts as a reference point in dating these fossils.
   - The fossil teeth were encountered in the same Iron Age cultural layers together with a wide diversity of archaeological fish originating from the Mediterranean Sea and the Nile.
   - They clearly do not represent food remnants although their use remains elusive. It may be they were brought to the city intentionally as the nearest fossil shark teeth bearing outcrops of Cretaceous age are situated in the Negev Desert, although similar aged layers also crop out near the City of David.
   - Intriguingly, the fossils were found together with hundreds of bullae — items used to seal confidential letters and packages — implying a possible connection with the administrative or governing class at some point.
   - There are no wear marks which might show that they were used as tools, and no drill holes to indicate that they may have been jewelry.
   - There is a market for shark’s teeth even today, so it may be that there was an Iron Age trend for collecting such items. This was a period of riches in the Judean Court.
   
   Reference:

   2. New Class of Neurons
   - The question of how the human brain recognizes the faces of familiar individuals has been important throughout the history of neuroscience.
   - Cells linking visual processing to the person’s memory have been proposed, but not found.
   - Now, a team of U.S. neuroscientists has discovered such cells in the brain’s temporal pole region; these cells responded to faces when they were personally familiar.
   - One neuron for the memory of one’s grandmother, another to recall one’s mother, and so on. At its heart, the notion of a one-to-one ratio between brain cells and objects or concepts was an attempt to tackle the mystery of how the brain combines what we see with our long-term memories.
   - Neuroscientists have since discovered plenty of sensory neurons that specialize in processing facial information, and as many memory cells dedicated to storing data from personal encounters.
Recently, Professor Freiwald and his colleagues discovered that a small area in the brain’s temporal pole region may be involved in facial recognition.

So they used functional magnetic resonance imaging as a guide to zoom in on the temporal pole regions of two rhesus monkeys, and recorded the electrical signals of temporal pole neurons as the macaques watched images of familiar faces and unfamiliar faces that they had only seen virtually, on a screen.

They found that neurons in the temporal pole region were highly selective, responding to faces that the subjects had seen before more strongly than unfamiliar ones.

And the neurons were fast, discriminating between known and unknown faces immediately upon processing the image.

Interestingly, these cells responded threefold more strongly to familiar over unfamiliar faces even though the subjects had in fact seen the unfamiliar faces many times virtually, on screens.

The cells of the temporal pole region behave like sensory cells, with reliable and fast responses to visual stimuli.

But they also act like memory cells which respond only to stimuli that the brain has seen before — in this case, familiar individuals — reflecting a change in the brain as a result of past encounters.

**Reference:**

3. **G - Quadruplexes**

DNA usually forms the classic double helix shape — two strands wound around each other. But approximately 1% of the human genome has the ability to fold into four-stranded ‘quadruple helix’ DNA structures called G - Quadruplexes (G4s).

G4s regulate several key cellular processes (e.g., transcription) and have been hypothesized to participate in others.

There have been only a handful of studies that provided experimental evidence for individual G4 elements playing functional roles.

Our study is the first to look at G4s across the genome to see if they show the characteristics of functional elements as a general rule.

To better understand the function of G4s, Dr. Guiblet and colleagues looked at their distribution across the genome, their thermostability, and whether or not they showed signs of being under the influence of natural selection, all in relation to other functional elements of the genome.

The researchers confirmed that, as a rule, G4s are more common in regions of the genome known to have important cellular functions and that the G4s in these regions are more stable than elsewhere in the genome.
• The 3D structure of G4s can form transiently and how stable their structure is depends on their underlying DNA sequence and other factors.
• Functional regions of the genome are generally maintained by a type of natural selection called purifying selection.
• Mutations in these regions could disrupt their function and be harmful to the organism. The mutations therefore are usually eliminated by purifying selection, which keeps the DNA sequence relatively unchanged over time.
• In nonfunctional regions of the genome, a mutation may have no impact and can persist in the genome without any consequences. These regions of the genome are said to evolve neutrally.
• First, geneticists focused almost exclusively on protein-coding genes, then we became aware of many functional non-coding elements, and now researchers have G4s and possibly other non-B DNA elements.
• Defining the full complement of functional genome elements is crucial for interpreting the potential disease consequences not only of inherited genetic variants but also of mutations arising within tissues over the lifetime of individuals.
• The identification of G4s as novel functional elements within the human genome is key to advancing the use of genetics in precision medicine.

Reference:

4. Synthetic Biology Circuits

• Researchers have designed the first synthetic biology circuit that relies exclusively on protein-protein interactions. These circuits can be turned on within seconds, much faster than other synthetic biology circuits.
• However, there is often a long lag time between an event such as detecting a molecule and the resulting output, because of the time required for cells to transcribe and translate the necessary genes.
• MIT synthetic biologists have now developed an alternative approach to designing such circuits, which relies exclusively on fast, reversible protein-protein interactions. This means that there’s no waiting for genes to be transcribed or translated into proteins, so circuits can be turned on much faster -- within seconds.
• Researchers now have a methodology for designing protein interactions that occur at a very fast timescale, which no one has been able to develop systematically. We’re getting to the point of being able to engineer any function at timescales of a few seconds or less.
• This kind of circuit could be useful for creating environmental sensors or diagnostics that could reveal disease states or imminent events such as a heart attack, the researchers say.
• Inside living cells, protein-protein interactions are essential steps in many signaling pathways, including those involved in immune cell activation and responses to hormones or other signals.

• In this study, the researchers used yeast cells to host their circuit and created a network of 14 proteins from species including yeast, bacteria, plants, and humans. The researchers modified these proteins so they could regulate each other in the network to yield a signal in response to a particular event.

• One could have a situation where the cell reports that information to an electronic device that would alert the patient or the doctor, and the electronic device could also have reservoirs of chemicals that could counteract a shock to the system.

Reference:
https://www.sciencedaily.com/releases/2021/07/210706153052.htm

5. Termite eating Dinosaurs

• Dinosaurs were generally huge, but a new study of the unusual alvarezsaurus shows that they reduced in size about 100 million years ago when they became specialized ant-eaters.

• The new work is led by Zichuan Qin, a PhD student at the Institute of Vertebrate Paleontology and Paleoanthropology in Beijing. He measured body sizes of dozens of specimens and showed that they ranged in size from 10-70 kg, the size of a large turkey to a small ostrich, for most of their existence and then plummeted rapidly to chicken-sized animals at the same time as they adopted a remarkable new diet: ant-eating.

• The alvarezsaurus lived from the Late Jurassic to Late Cretaceous (160 to 70 million years ago) in many parts of the world, including China, Mongolia, and South America.

• They were slender, two-legged predators for most of their time on Earth, pursuing lizards, early mammals, and baby dinosaurs as their diet.

• This restructuring of ecosystems has been called the Cretaceous Terrestrial Revolution, marking the time when modern-style forests and woodlands emerged, with diverse plants and animals, including insects that specialised to pollinate the new flowers and to feed on their leaves, petals and nectar.

• A key problem with many Alvarezsaur specimens, especially the chicken-sized ones, was to be sure they were all adults.

• Interestingly, alvarezsaur dinosaurs were indeed not small in size or ant-eaters at start.

• All other dinosaurs were getting bigger and bigger, but one group of flesh-eaters miniaturized, and this was associated with living in trees and flying. They eventually became birds. The scientists have identified a second miniaturization event -- but it wasn’t for flight, but to accommodate a completely new diet, switching from flesh to termites.

Reference:
https://www.sciencedaily.com/releases/2021/07/210706115326.htm
UPSC Previous year questions based on today’s concept:

2. Genetic Polymorphism (15 Marks - 2011)

DAILY PRACTICE QUESTION/S FOR MAINS 2021.

Pl do not forget to upload your answer sheet for a peer review on the telegram channel: Sosin for Anthropology Q&A

1. Environmental Determinism. (15 Marks)