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, 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. Physical Exercise & Brain Health
- Some sections of our DNA are genes, which are instructions for building proteins, while other sections — called enhancers — regulate which genes are switched on or off, when, and in which tissue.
- Regular physical activity decreases the risk of multiple common disorders such as cardiovascular disease, type 2 diabetes, cancer, and neurological conditions, along with the overall risk of mortality.
- New research from the University of Copenhagen and the Karolinska Institutet provides evidence of a functional link between epigenetic rewiring of enhancers to control their activity after exercise training and the modulation of disease risk in humans.
- The beneficial effects of exercise training on human health are partially driven by adaptations of the skeletal muscle tissue.
- Exercise-induced adaptations include coordinated changes in the expression of genes controlling substrate usage and metabolic efficiency in skeletal muscle.
- In addition to the adaptations that occur within skeletal muscle cells, exercise exerts systemic effects on whole-body homeostasis by triggering the release of soluble factors from the muscle that signal to distal tissues, such as brain, liver, and adipose tissue.
- The mechanisms by which training-induced adaptations of skeletal muscle orchestrate positive effects at the whole-body level are poorly understood.
- For the study, the researchers recruited eight healthy Caucasian men (mean age 23 years) and put them through a six-week endurance exercise program.
- Researchers collected a biopsy of their thigh muscle before and after the exercise intervention and examined if changes in the epigenetic signature of their DNA occurred after training.
- They discovered that after completing the endurance training program, the structure of many enhancers in the skeletal muscle of the young men had been altered.
- By connecting the enhancers to genetic databases, the scientists found that many of the regulated enhancers have already been identified as hotspots of genetic variation between individuals.
- In particular, they found that exercise remodels enhance activity in skeletal muscle that are linked to cognitive abilities, which opens for the identification of exercise training-induced secreted muscle factors targeting the brain.

Reference:

2. Immune Cell Function
- Regulatory T - Cells (Tregs) help control inflammation and autoimmunity in the body.
● These cells are so important that scientists are working to generate stable induced Tregs (iTregs) in vitro for use as treatments for autoimmune diseases as well as rejection to transplanted organs.
● Unfortunately, it has proven difficult to find the right molecular ingredients to induce stable iTregs.
● Now, a team of U.S. researchers has found that vitamin C and proteins of the TET family can work together to give Tregs their life-saving power.
● A major type of epigenetic modification involves the DNA itself through the addition or removal of molecules called methyl groups from cytosines, one of the four DNA bases.
● On the other hand, vitamin C confers iTregs enhanced IL-2/STAT5 signaling by increasing the expression level of IL-2 receptor and the functional form of STAT5, and STAT5 binding to essential regions in the genome, rendering these cells survive better in tough environments with low IL-2 supplementation.
● This research gives us a new way to think about treating autoimmune diseases.

Reference:

3. Combating Malnutrition

Malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients.

● India faces a huge burden of malnutrition rooted in its social, economic, and cultural asymmetries and challenges.
● According to the National Family Health Survey (NFHS)-4 conducted in 2014-15, for children under five years of age, 38.4 percent were stunted (height-for-age), 21 percent were wasted (weight-for-height), 7.5 per cent were severely wasted (weight-for-height), 35.8 percent were underweight (weight-for-age) and 58.6 percent were anaemic.
● Apart from the most popular method of treating children with acute malnutrition at the Bal Sewa Kendra (BSK) or Child Malnutrition Treatment Centers (MTCs), Community Management of Acute Malnutrition (CMAM) is a proven approach to manage SAM in children under five.
● CMAM involves timely detection and treatment of SAM children without medical complications with ready-to-use-nutrient-dense-foods at the community level itself.
● A standard CMAM approach consisted of setting-up of treatment sites closer to the community, weekly monitoring of uncomplicated SAM children, an in-patient facility to admit children with SAM and associated medical complications along with provision of Modified Energy Dense Nutritional Food (EDNRF), Modified Hot Cook Meal (HCM) and Modified Take Home Ration (THR).
● The targeted programme resulted in children achieving the desired weight after treatment, thereby significantly improving the nutritional status.
• While Kerala has been a forbearer of such praxis since long, Odisha has been able to reach this level in just the last 20 years with the advent of the Mission Shakti Programme — a scheme to organise women into self-help groups first as a livelihood initiative.

• In a similar vein, Rajasthan, Gujarat, and Uttar Pradesh are some of the other states that have also shown effectiveness towards this approach.

• According to a study by Lancet 2019, multiple forms of malnutrition (MOM) reduce nearly 8 percent of a nation’s economic growth.

• As the wealth of the nation depends not only on the skills and knowledge but health and nutrition of its people, it is high time that India caters to its eight million SAM children, if it aspires to be a $5-trillion economy by 2024-25.

**Reference:**
https://indianexpress.com/article/opinion/combating-malnutrition-in-india-7266396/

4. Controlling Gene Expression

**Context:**
New, reversible CRISPR methods can control gene expression while leaving the underlying DNA sequence unchanged.

**Gene Expression:**
Gene expression is the process by which the instructions in our DNA are converted into a functional product, such as a protein.

• Gene expression is the process that allows a cell to respond to its changing environment.

• It acts as both an on/off switch to control when proteins are made and also a volume control that increases or decreases the amount of proteins made.

**Highlights:**
• A new gene editing technology called CRISPRoff allows researchers to control gene expression with high specificity while leaving the sequence of the DNA unchanged.

• The method is stable enough to be inherited through hundreds of cell divisions, and is also fully reversible.

• This can be done for multiple genes at the same time without any DNA damage, with great deal of homogeneity, and in a way that can be reversed. Hence it makes it a great tool for controlling gene expression.

**Reference:**

5. DNA Rewriting

• The Nobel Prize for Chemistry in 2020 was shared by Jennifer Doudna and Emmanuelle Charpentier.

• Turning a bacterial defense mechanism into one of the most powerful tools in genetics has earned Jennifer Doudna and Emmanuelle Charpentier the Nobel Prize in chemistry.

• The ability to cut the DNA where you want has revolutionized the life sciences.
● These genetic scissors are called CRISPR/Cas9.
● The genetic scissors were discovered just eight years ago, but have already benefited humankind greatly.
● CRISPR stands for Clustered Regularly Interspaced Short Palindromic Repeats. In essence, these short, repeating bits of DNA sandwich bacteria’s version of the invading viruses. Every time bacteria encounter a virus, they take a DNA mugshot of it and file it in between the repeats.
● The next time the bacteria encounters that virus, they make RNA copies of the mug shots. Those RNA photocopies then team up with another bit of RNA known as a trans-activating CRISPR RNA, or tracrRNA, to form an all-points bulletin known as a guide RNA. Guide RNAs shepherd the DNA-cutting enzyme Cas9 to the virus, where the enzyme chops and eliminates the threat.

Reference:
https://www.thehindu.com/books/books-reviews/the-code-breaker-review-the-quest-to-rewrite-dna/article34333389.ece

UPSC Previous year questions based on today’s concept:
1. Discuss the areas in which the knowledge of It human genetics can be applied. (Long Question - 2004)
2. Describe Mendel’s laws of inheritance. Describe the recent advances in the field of human genetics. (L.Q - 1992)

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. Recombinant DNA Technology (15 Marks)