Prelim Bits 18-01-2022 | UPSC Daily Current Affairs

Muscle Dysfunction and Vitamin D

A new study has examined the molecular nature of muscle dysfunction in mice, in the absence of vitamin D.

- Usually, the glucose absorbed from the food is converted into glycogen and stored in the skeletal muscle.
- This stored energy reserve is used by muscles to produce energy after the food consumed is digested.
- Without the vitamin D, the skeletal muscles continued to make glycogen, but could not convert them into glucose (usable form of energy).
- When the glycogen storage does not give energy, particularly in a post-absorb state, the skeletal muscle draws more glucose from the blood. This leads to a systemic energy shortage.
- When there is systemic lack of energy, the protein degradation in muscle is triggered leading to muscle wasting.
- This shows that vitamin D deficiency starves the skeletal muscles, leading to muscle wasting.

Functions of Vitamin D

- Vitamin D works more as a hormone than and is involved in a host of biochemical reactions.
- It is key to maintaining metabolic functions, immune system, bone health and plays a crucial role in depression, mood swings, anxiety and sleep quality.
- As part of the normal metabolic process, proteins produced in our body degrade, and in due course, new proteins are made to replace them.
- Usually, when the protein degradation exceeds protein synthesis, skeletal muscle atrophy or simply a decrease in muscle mass occurs. This is what happens during Vitamin D deficiency.

Reference

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Social Constructivism

- Social constructivism is a school of thought in International Relations (IR) theory.
- Constructivism's arrival in IR is often associated with the end of the Cold War, an event that the traditional theories such as realism and liberalism failed to account for.
- The term 'Social constructivism' was first coined by Nicholas Onuf in 1989 in his book "The World of our making".
- In this book, he put forward that nation states much like individuals lived in a reality primarily formed by themselves rather than outside material entities.
- We are not made but constructed by our social and cultural relations with others.
- Similarly states by interstate interactions and associations form their identities and interests which in turn inform the structures and institutions they make among themselves.
- Structures are real, material and relatively stable but it is only by assigning collective meanings on our structures that they will achieve their purpose.

Reference

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2. https://www.e-ir.info/2018/02/23/introducing-constructivism-in-international-relations-theory/

Report on Solar Waste

According to a report prepared by the National Solar Energy Federation of India, India could generate over 34,600 tonnes of cumulative solar waste by 2030.

- Solar waste is the electronic waste generated by discarded solar panels.
- It is sold as scrap in India. It can increase by at least four-five-fold by the next decade.
- **Issues** - Manufacturing solar panels often requires the use of several noxious chemicals.
- Solar panels have an operating lifespan of around 20 to 30 years.
- Since they were first introduced in the 2000s, literal tons of solar panels are reaching the end of their lifespan.

- Because it's not easy to properly dispose of the toxic metals inside the solar cells, it is often cheaper to discard them in landfills or send them to developing countries.
- As solar panels sit in dumps, the toxic metals they contain can leech out into the environment and possibly pose a public health hazard if they get into the groundwater supply.
- **Technologies in India** - Two most popular module technologies in India are crystallised silicon (C-Si) and thin-film (mainly cadmium telluride), with 93 and 7% market shares respectively.
- Both the technologies have a recovery rate of 85-90%.
- But the large cost gap between recycling and discarding panels in landfills is the reason why it is not recycled enough.
- **Solution** - The issue of the solar waste was not addressed in the last electronic waste management regulations in 2016.
- So, India should focus on drafting comprehensive rules to deal with solar waste.
- Ban on Landfills that accept solar panel waste.
- New business models, incentives or issues of green certificates to be provided to encourage the recycling industry to participate more.
- R&D: Innovation in design may have an impact on the type of waste they generate; technology advancements will be significant in reducing the impact of renewable energy waste.

Reference

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2. https://www.discovermagazine.com/environment/solar-panel-waste-the-dark-side-of-clean-energy

Millimetre Wave Band in 5G Auctions

Telecom Regulatory Authority of India (TRAI) has asked for views on band plan, block size, and conditions for auction of spectrum in 5G bands, which includes Millimetre (mm) Wave band of 24.25-28.5 GHz.

- Millimetre Wave band or mmWave is a segment of **radio frequency spectrum** that range between 24 GHz and 100 GHz.
- This spectrum, as the name suggests, has a short wavelength.
- This spectrum is apt to deliver greater speeds and lower latencies.
- This makes data transfer efficient and seamless as the current available networks work optimally only on lower frequency bandwidths.

- 5G services can be deployed using lower frequency bands.
- They can cover greater distances and are proven to work efficiently even in urban environments, which are prone to interference.
- But, when it comes to data speeds, these bands fail to hit peak potential needed for a true 5G experience.
- So, mmWave is that quintessential piece in the 5G jigsaw puzzle for mobile service providers.

Reference

1. https://www.thehindu.com/sci-tech/technology/the-controversy-over-inclusion-of-the-mmwave-band-in-5g-auctions/article38271156.ece/amp/
2. https://www.sciencedirect.com/topics/engineering/millimeter-wave

Thiruvalluvar

The Prime Minister of India has paid tributes to the great Thiruvalluvar on Thiruvalluvar Day (January 15).

- Thiruvalluvar or Valluvar is a Tamil poet-saint and philosopher. He is regarded as a cultural icon.
- His most popular work is a collection of couplets on politics, ethics, economy, and love, called “Thirukkural” (Sacred Couplets).
- Tiruvalluvar is believed to have lived in Chennai (formerly Madras), Tamil Nadu with his wife, Vasuki.
- **Period** - Though the period in which he existed is also debatable, some people claim that he lived between the 8th and 9th centuries.
- Tamil orator, and father of the Pure Tamil movement, Maraimalai Adigal had stated 31 BC as the birth year of Thiruvalluvar.
- The Czech scholar in Indian literature and linguistics, Kamil Zvelebil, had noted that Valluvar lived around 500 AD.
- **Religion** - Thiruvalluvar was probably a Jain ascetic of humble origins who worked as a weaver.
- Both Buddhists and Shaivites, however, claim him as their own, and he is especially revered by those of low caste.
- **Statue** - A 133-foot statue of Thiruvalluvar that stands at Kanyakumari was inaugurated in 2000. It was sculpted and designed by renowned architect and sculptor V Ganapati Sthapati.
- In 2009, another statue was unveiled in Ulsoor, near Bengaluru.
- Outside the School of Oriental and African Studies in Russell Square, London, a statue of Valluvar was also erected.
- Inside the Ekambareswarar temple complex in Chennai, a temple

dedicated to Thiruvalluvar.
- In 1976, a temple-memorial called Valluvar Kotam was built in Chennai.

Reference

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