Microbiome Link to Autism

Why in News?

It is found that **Gut Microbiome** composition in humans implicates several diseases, including **Autism**, Crohn's disease etc.

- Gut microbiome or gut microbiota, are the microorganisms, **including bacteria, archaea, fungi, and viruses that live in the digestive tracts of humans,** they affect the body from birth and throughout life by controlling the digestion of food, immune system, central nervous system and other bodily processes.

What is Autism?

- **About:**
  - Autism spectrum disorder (ASD) is the term for **a group of neurodevelopmental disorders.**
  - Researchers are yet to fully understand the aetiology of ASD. However, they are beginning to find that a disorder in the gut-brain axis could have a prominent part.
    - Aetiology is the study of the factors that cause a condition or disease.
  - It is a complex brain development disability which makes **itself visible during the first 3 years of a person's life.**
  - It is **not mental retardation** as people with autism **may show excellent skills in spheres like art, music, writing** etc. The level of intellectual functioning in individuals with ASDs is extremely variable, extending from profound impairment to superior levels.

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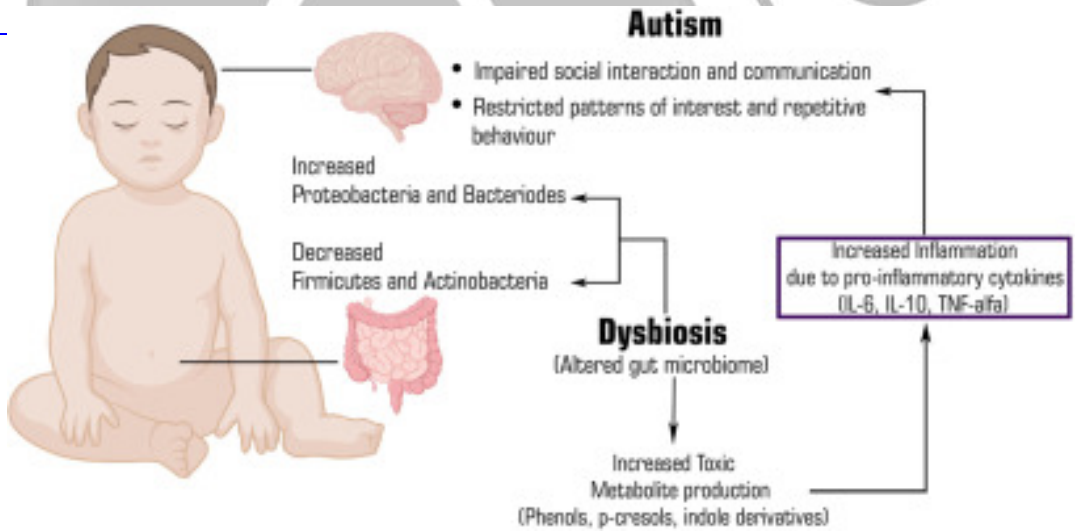

- **Causes:**
  - There are probably many factors that make a child more likely to have an ASD, including environmental and genetic factors.
  - According to the **World Health Organisation (WHO),** ASD affects **one in 100 children.**

- **Signs and Symptoms:**
    - Children with ASD have impaired social interactions, lack verbal and nonverbal communication skills, and display restricted and repetitive behaviours.
- **Cure:**
    - Although **autism is not curable**, its symptoms can be addressed with appropriate interventions like evidence-based psychosocial interventions, behavioral treatment and skills training programmes for parents and other **caregivers, health promotion, care, rehabilitation services, etc.**

What is the Link Between Gut Microbiome and Autism?

- The **human microbiome**, sometimes **called the "forgotten organ"**, plays a significant role in an array of **host processes, including growth, development, physiology, immunity, nutrition,** and disease.
- The gut microbiome is believed to have a **big impact on immune modulation and metabolic activities in the human body.**
    - Immune modulation refers, among other things, to the efforts of the immune system to **ensure its response is proportionate to a threat.**
- Some scientists have disputed the significance of the gut microbiome by contending that the microbiome can't cause ASD and therefore its role in the pathophysiology of ASD is limited.
- But research on this topic has shown that even if the gut microbiome doesn't play a causative role, abnormalities in it can challenge a person with toxic metabolites and keep the **person from synthesizing the metabolites required to produce** neurotransmitters involved in cognition, behaviour, mood, and sleep.
- As a result, 'fixing' the gut in ASD **can reduce the toxic burden,** including that which moves through the blood-brain barrier, and/or help complete the necessary neurotransmitter synthesis pathways.

What are the Initiatives Related to ASD?

- United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), Sustainable Development Goals deal with rights of people with disabilities including autism.
- The **Right of Persons with Disabilities Act, 2016** increased the types of disabilities from 7 to 21. It also added autism spectrum disorder among others, which were largely ignored in earlier Act.
- In 2014, the **World Health Organisation (WHO)** adopted a resolution entitled "Comprehensive and coordinated efforts for the management of ASD," which was supported by more than 60 countries.
- In 2008, the United Nations General Assembly unanimously declared 2nd April as **World Autism Awareness Day.**

UPSC Civil Services Examination Previous Year Question (PYQ) nation

Q. Consider the following statements in respect of probiotics:

1. Probiotics are made of both bacteria and yeast.
2. The organisms in probiotics are found in foods we ingest but they do not naturally occur in our gut.
3. Probiotics help in the digestion of milk sugars.

Which of the statements given above is/are correct?

(a) 1 only
(b) 2 only
(c) 1 and 3
(d) 2 and 3

Ans: (c)

Exp:

- Probiotics are a combination of live beneficial bacteria and/or yeasts that naturally live in your body. Bacteria is usually viewed in a negative light as something that makes you sick. **Hence, statement 1 is correct.**
- Acidophilus is a probiotic bacteria that naturally occurs in the human gut and other parts of the body.This bacteria helps the digestive system break down sugars, such as lactose, into lactic acid. Trillions of bacteria and other micro-organisms live in every person's gut. There are several ways you can take a probiotic supplement. They come in a variety of forms, including in Foods,Drinks,Capsules or pills, Powders, Liquids. **Hence, statement 2 is not correct but statement 3 is correct.**

Source: TH