Science & Technology · GS - III

Discuss the potential of the human microbiome in drug discovery. What challenges must be addressed to translate this research into effective treatments?

EXAM YEAR	PAPER	SUBJECT
DAILY PRACTICE 24/10/2026	GS - III	Science & Technology

MARKS	WORD LIMIT
10	~150 words

Answer Hint

Microbial metabolites, antimicrobial resistance, biotechnology, genome mining, clinical trials, safety, precision medicine.

Model Answer

Introduction:

The human microbiome consists of microorganisms inhabiting different parts of the body. Their biochemical activities offer a promising, relatively underexplored source of therapeutic compounds.

Potential applications:

1. New antibiotics: Microbial compounds may help combat drug-resistant pathogens.
2. Novel medicines: Microbial metabolites could provide leads for treatments targeting inflammation, infections and other disorders.
3. Precision medicine: Understanding individual microbiomes may help explain differences in drug responses.
4. Biotechnology: Genome mining and synthetic biology can accelerate the discovery and production of promising compounds.

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Challenges:

Many compounds remain poorly characterised. Researchers must establish their safety, effectiveness, dosage and long-term effects through rigorous testing. Large-scale production and regulatory approval can also be costly.

Way Forward:

India should strengthen microbiome research, interdisciplinary collaboration, clinical research infrastructure and responsible data governance.

Conclusion:

The microbiome offers a valuable new frontier for drug discovery, but promising laboratory findings must be validated through clinical trials before becoming established treatments.

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