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Q7(a)

Discuss the role of evolutionary forces in creating human diversity

UPSC Civil Services Mains 2022 · Anthropology GS 1 · 20 marks · Synthetic theory of evolution

(c) Synthetic theory of evolution; Brief outline of terms and concepts of evolutionary biology (Doll's rule, Cope's rule, Gause's rule, parallelism, convergence, adaptive radiation, and mosaic evolution).

Core demand of the question

- Discuss the role of evolutionary forces in creating human diversity
- Write about 250 words for 20 marks

Revision summary

Four genetic forces plus culture make human diversity.

Mutation invents; selection sorts; **drift** rumples small groups; flow mixes.

Malaria and dairying are gene-culture cases.

Indian data show both isolate **drift** and long-range mixture.

Races as types fail; clines and histories hold.

Introduction

Human diversity is patterned difference in genes, bodies, and, by extension, the cultural niches that change survival. Four forces of population genetics, plus culture, make that pattern.

Body

The four forces

- **Mutation** supplies new alleles. Most are neutral or harmful; a few, like **lactase persistence** or sickle-cell, matter.
- **Selection** retains what fits a niche. Malaria shapes haemoglobin. Ultraviolet light and diet shape pigmentation and stature clines, which **Livingstone** and later geneticists refused to treat as races.
- **Drift** is strong in small founder groups. Island and tribal isolates, including some Andaman and Himalayan populations, show this.
- **Gene flow** mixes. Indian caste and tribal history is a story of flow as much as of barrier, which **Sanghvi** and later autosomal studies mapped.

Culture as a force

- **Durham** and gene-culture coevolution: dairying selects lactase; yam farming and malaria select **sickle cell** in West Africa.
- Migration, marriage rules, and cousin preference change effective population size and inbreeding.

What diversity is not

- Typological races are not evolutionary units. Clines and clusters from history are.
- Language and caste are social. They can still structure mating and therefore genes.

Flow diagram

Mutation -> Diversity
Selection -> Diversity
Drift -> Diversity
Gene flow -> Diversity
Culture marriage -> Selection
Culture marriage -> Gene flow

Conclusion

Mutation, selection, **drift**, and flow, working through culture and marriage, create human diversity. The product is clines and local histories, not a few fixed types.

Facts & figures

Sickle cell

Heterozygote advantage under falciparum malaria, a teaching case of selection.

Lactase persistence

Pastoral culture creating a genetic response in Europe, Africa, and parts of India.

Drift

Random change, marked in founder tribes and island isolates.

Livingstone

On the non-existence of human races as biological types; malaria and clines instead.