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Q6(b)

Explain the role of heredity and environment in the formation of races.

UPSC Civil Services Mains 2016 · Anthropology GS 1 · 15 marks · Race and racism, biological basis of morphological variation of non-metric and metric characters. Racial criteria, racial traits in relation to heredity and...

9.5 Race and racism, biological basis of morphological variation of non-metric and metric characters. Racial criteria, racial traits in relation to heredity and environment; biological basis of racial classification, racial differentiation and race crossing in man.

Core demand of the question

- Explain the role of heredity and environment in the formation of races
- Write about 200 words for 15 marks

Revision summary

Some traits are heritable and locally selected.

Most genetic variation is within groups, not between classical races.

Environment and plasticity change the growing phenotype.

Boas showed that 'racial' head form shifts with place.

Populations form by **clines** and admixture, not pure types.

Introduction

Classical 'races' were treated as hereditary types. Living human variation is clinal, polygenic, and always jointly shaped by genes and environment.

Body

Heredity

- Skin colour, some body proportions, and many blood polymorphisms have a genetic component.
- **Bergmann** and **Allen** trends, **sickle cell**, and **lactase** alleles show selection in place, not a three-race Noah's ark.
- **Lewontin** showed most genetic diversity is within continental groups. Race as a few boxes fails the genome.

Environment

- **Sun, diet, altitude, and disease shape phenotype through growth: Tanner** secular trends, **Andean** and **Tibetan** hypoxia answers.
- **Plasticity**: the same genotype yields different stature in famine and plenty. **Boas** immigrant studies already showed head form is not a fixed race mark.

- **Culture is environment:** clothing, marriage networks, and caste endogamy structure gene flow.

Formation, not types

- Populations form by isolation, selection, drift, and admixture. They do not form as pure races.
- Forensic ancestry estimates are statistical. They are not a return to colonial race science.

Flow diagram

Human variation -> Alleles selection drift
Human variation -> Climate diet culture
Alleles selection drift -> Populations clines
Climate diet culture -> Populations clines

Conclusion

Heredity supplies alleles under selection and drift. Environment and culture shape both gene frequencies and the growing body. Races as fixed hereditary types are a poor model of that process.

Facts & figures

Boas

Immigrant study: cranial indices changed in American-born children.

Lewontin

1972: the larger share of allozyme diversity is within populations.

Clines

Gradual geographic change, as in skin colour, against sharp race borders.

Sickle cell

A hereditary allele maintained by a malarial environment.