

Tibetan Plateau: Humans Rapidly Evolving in Real-Time

Description

Humans are still evolving, adapting to our surroundings with changes recorded in our biology. Some environments can be tough for us—like high altitudes where mountain climbers often experience [altitude sickness](#). This is due to a drop in atmospheric pressure, which reduces oxygen intake with each breath.

Yet, on the Tibetan Plateau, where oxygen levels are significantly lower, people thrive. Over more than 10,000 years of inhabiting this harsh environment, Tibetan highlanders have developed remarkable adaptations. These changes help them combat long-term oxygen deficiencies, commonly causing hypoxia in others.

Anthropologist Cynthia Beall from Case Western Reserve University in the US describes this adaptation as a prime example of our species' significant biological variation and resilience under extreme stress.

Beall's recent research, published in 2024, highlights specific adaptations in Tibetan populations, particularly in women. She examined 417 women living above 3,500 meters, measuring their hemoglobin levels, which indicate how efficiently oxygen is carried in the blood.

Interestingly, these women, who had the highest live birth rates, didn't have high or low hemoglobin levels. Instead, they boasted average levels with high oxygen saturation. This trait allows optimal oxygen delivery without making the blood too thick, which could strain the heart.

Moreover, women with enhanced reproductive success also showed increased blood flow to the lungs and larger left heart ventricles, promoting better oxygen distribution throughout the body.

In summary, this study reveals the fascinating, ongoing process of natural selection. Although cultural factors play a role, these physical adaptations are pivotal for survival. As Beall notes, understanding these adaptations offers valuable insights into human evolution.

The findings were published in the [Proceedings of the National Academy of Sciences](#).

Vocabulary List:

1. **Altitude** /'æl.tɪ.tju:d/ (noun): The height of an object or point in relation to sea level or ground level.
2. **Hypoxia** /haɪ'pɒk.si.ə/ (noun): A condition in which there is inadequate oxygen supply to the tissues.
3. **Resilience** /rɪ'zɪl.jəns/ (noun): The capacity to recover quickly from difficulties; toughness.
4. **Adaptation** /,æd.əp'teɪ.ʃən/ (noun): A change or the process of change by which an organism or species becomes better suited to its environment.
5. **Saturation** /,sætʃ.ə'reɪ.ʃən/ (noun): The state or process that occurs when no more of something can be absorbed combined with or added.
6. **Distribution** /,dɪs.trib'ju:.ʃən/ (noun): The action of sharing something out among a number of recipients.

Comprehension Questions

Multiple Choice

1. What is one environment mentioned in the text that can be tough for humans due to a drop in atmospheric pressure?

- Option: Desert regions
- Option: Tibetan Plateau
- Option: Rainforests
- Option: Islands

2. What do Tibetan highlanders who have inhabited the Tibetan Plateau for over 10,000 years develop to combat long-term oxygen deficiencies?

- Option: Remarkable adaptations
- Option: Increased height
- Option: Resistance to cold
- Option: Stronger muscles

3. What did Anthropologist Cynthia Beall study in Tibetan women to understand their adaptations to high altitudes?

- Option: Cholesterol levels
- Option: Hemoglobin levels
- Option: Vitamin intake
- Option: Bone density

4. What physiological trait did the Tibetan women with the highest live birth rates exhibit?

- Option: Low hemoglobin levels
- Option: High hemoglobin levels
- Option: Average hemoglobin levels with high oxygen saturation
- Option: Thick blood

5. According to the study mentioned in the text, what trait do women with enhanced reproductive success show in terms of blood flow?

- Option: Decreased blood flow to the lungs
- Option: Increased blood flow to the lungs
- Option: Normal blood flow to the lungs
- Option: No impact on blood flow

6. Which publication featured the findings of the research discussed in the text?

- Option: The New England Journal of Medicine
- Option: Nature Communications
- Option: Proceedings of the National Academy of Sciences
- Option: Journal of Biological Evolution

True-False

7. Humans are no longer evolving according to the text.

8. Tibetan highlanders do not have any remarkable adaptations despite living in a harsh environment.

9. The study by Anthropologist Cynthia Beall focused on measuring women's vitamin intake at high altitudes.

10. Women with the highest live birth rates had low hemoglobin levels according to the text.

11. Enhanced reproductive success in women did not show any changes in blood flow to the lungs.

12. Cultural factors play a significant role in the physical adaptations discussed in the study.

Gap-Fill

13. According to the text, Tibetan highlanders have inhabited the Tibetan Plateau for over 10,000 years,

developing remarkable adaptations to combat long-term oxygen deficiencies, commonly causing _____ in others.

14. Anthropologist Cynthia Beall examined 417 women living above 3,500 meters, measuring their hemoglobin levels, which indicate how efficiently oxygen is carried in the _____.

15. Women with enhanced reproductive success showed increased blood flow to the _____, promoting better oxygen distribution throughout the body.

16. The findings of the study by Cynthia Beall were published in the Proceedings of the National Academy of Sciences _____.

17. According to Anthropologist Cynthia Beall, understanding these adaptations offers valuable insights into human _____.

18. Tibetan women with high live birth rates exhibited average hemoglobin levels with high oxygen saturation, allowing optimal oxygen delivery without making the blood too _____, which could strain the heart.

Answer

Multiple Choice: 1. Tibetan Plateau 2. Remarkable adaptations 3. Hemoglobin levels 4. Average hemoglobin levels with high oxygen saturation 5. Increased blood flow to the lungs 6. Proceedings of the National Academy of Sciences

True-False: 7. False 8. False 9. False 10. False 11. False 12. True

Gap-Fill: 13. hypoxia 14. blood 15. lungs 16. Sciences 17. evolution 18. thick

Vocabulary quizzes

Multiple Choice (Select the Correct answer for each question.)

1. Which term refers to the height of an object or point in relation to a specified reference level usually above sea level?

- Option: Altitude
- Option: Hypoxia
- Option: Resilience
- Option: Adaptation

2. Which term relates to the heart or blood vessels?

- Option: Distribution
- Option: Cardiac
- Option: Seizure
- Option: Revived

3. Which term means to make less severe serious or painful?

- Option: Exhaustive
- Option: Burdened
- Option: Mitigate
- Option: Compounds

4. What are substances that can prevent or slow damage to cells caused by free radicals?

- Option: Concoction
- Option: Antioxidants
- Option: Moderation
- Option: Efficacy

5. Which term refers to a meeting with an expert or professional in order to seek advice?

- Option: Revived
- Option: Consultation
- Option: Oxidative
- Option: Detrimental

6. Which term means to give in to a desire especially one that is considered excessive or unwise?

- Option: Indulges
- Option: Habits
- Option: Incite
- Option: Adverse

7. Which term refers to the state of being completely soaked with a liquid?

- Option: Enchantment
- Option: Saturation
- Option: Vitality
- Option: Resilience

8. Which term refers to the ability to produce a desired or intended result?

- Option: Resilience
- Option: Efficacy
- Option: Compounds
- Option: Oxidative

9. Which term means to make a problem bad situation or negative feeling worse?

- Option: Rejuvenating
- Option: Detrimental
- Option: Exacerbated
- Option: Enchantment

10. Which term means to give strength or energy to?

- Option: Invigorate
- Option: Mitigate
- Option: Compounds
- Option: Resilience

Gap-Fill (Fill in the blanks with the correct word from the vocabulary list.)

11. _____ is the capacity to recover quickly from difficulties; toughness.

12. _____ is a condition in which the body or a region of the body is deprived of adequate oxygen supply at the tissue level.

13. The spa offers a range of _____ treatments aimed at refreshing and revitalizing the body and mind.

14. The company's products have a wide _____ across various regions of the country.

15. Chemical _____ are formed when atoms of different elements are chemically bonded together.

16. The medication may have _____ effects if not taken according to the prescribed dosage.

17. The beauty of the landscape held a certain _____ that captivated all who beheld it.

18. Regular exercise and a balanced diet contribute to maintaining good levels of _____ and health.

19. It is important to consume alcohol in _____ to avoid negative health impacts.

20. _____ stress occurs when there is an imbalance between free radicals and antioxidants in the body.

Matching Sentences (Match each definition to the correct word from the vocabulary list.)

21. After a long hike the hiker's clothes were completely wet as they reached a point of with sweat.

22. The fresh mountain air can even the weariest of travelers providing them with renewed energy.

23. Excessive consumption of sugary drinks can be to one's dental health over time.

24. During the holidays it is easy to in rich calorie-laden foods without considering the consequences.

25. The weight of unresolved issues can leave a person feeling emotionally and overwhelmed.

26. The community showed great in rebuilding after the devastating tornado tore through the town.

27. It is advisable to seek medical before starting any new exercise regimen especially for individuals with underlying health conditions.

28. Regular exercise is beneficial for maintaining a healthy system and reducing the risk of heart disease.

29. The chef's secret of herbs and spices gave the dish its unique and unforgettable flavor.

30. The clinical trial demonstrated the high of the new drug in treating the rare disease.

Answer

Multiple Choice: 1. Altitude 2. Cardiac 3. Mitigate 4. Antioxidants 5. Consultation 6. Indulges 7. Saturation 8. Efficacy 9. Exacerbated 10. Invigorate

Gap-Fill: 11. Resilience 12. Hypoxia 13. Rejuvenating 14. Distribution 15. Compounds 16. Adverse 17. Enchantment 18. Vitality 19. Moderation 20. Oxidative

Matching sentence: 1. Saturation



2. Invigorate 3. Detrimental 4. Indulges 5. Burdened 6. Resilience 7. Consultation 8. Cardiac 9. Concoction
10. Efficacy

CATEGORY

1. Health - LEVEL4

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Author

aimeeyoung99

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