Flex Therapist CEUs

Hormetic Stress - Successful Integration into Physical Therapy

1. What is one major cellular process activated by hormetic stress, which is crucial for maintaining cellular health and longevity?

A. Apoptosis
B. Autophagy
C. Necrosis
D. Metastasis

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2. Which of the following adaptations is NOT typically associated with intermittent fasting as a form of hormetic stress?

A. Improved insulin sensitivity
B. Increased mitochondrial efficiency
C. Enhanced muscle hypertrophy
D. Upregulation of autophagy

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3. How does HIIT (High-Intensity Interval Training) induce hormetic stress beneficial for muscle adaptations?

A. By maintaining constant low-level physical effort
B. By alternating high-intensity effort with recovery periods
C. By reducing energy expenditure and oxygen utilization
D. By avoiding oxidative stress

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4. How do phytochemicals exert a hormetic effect on cells?

A. By inducing high levels of cellular stress
B. By triggering mild oxidative stress that stimulates adaptive responses
C. By preventing all forms of oxidative stress
D. By enhancing immediate cellular damage

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5. In the context of hormetic stress, what is a primary benefit of controlled hypoxia through breathwork?

A. Promotes oxidative damage
B. Suppresses the production of erythropoietin
C. Enhances mitochondrial function and angiogenesis

D. Reduces the number of red blood cells

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6. Which of the following best describes how hormetic stress influences oxidative stress levels?

A. Hormetic stress reduces oxidative stress by lowering the production of pro-inflammatory cytokines.
B. Hormetic stress increases oxidative stress by boosting the production of reactive oxygen species (ROS).
C. Hormetic stress enhances antioxidant defenses by increasing the production of antioxidant enzymes like superoxide dismutase (SOD).
D. Hormetic stress has no significant impact on oxidative stress levels.

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7. Which mechanism is NOT a way that hormetic stressors help maintain cellular health?

A. Increasing the production of heat shock proteins (HSPs).
B. Promoting the degradation of healthy cellular components.
C. Activating autophagy to recycle damaged cellular components.
D. Activating the Nrf2 pathway to promote antioxidant gene expression.

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8. How does hormetic stress enhance vagal nerve function?

A. By increasing the production of pro-inflammatory cytokines which stimulate vagal activity.
B. By enhancing neuroplasticity and stimulating brain-derived neurotrophic factor (BDNF) levels.
C. By decreasing sympathetic nervous system activity alone.
D. By reducing mitochondrial biogenesis, thus improving vagal tone.

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9. Which of the following mechanisms explains how hormetic stress can positively affect chromosome telomere shortening?

A. By activating telomerase and increasing autophagy.
B. By reducing the production of heat shock proteins.
C. By decreasing mitochondrial function and telomerase activity.
D. By promoting chronic oxidative stress.

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10. Which of the following is a method by which hormetic stress can improve metabolic health?

A. Enhancing the activation of pro-inflammatory pathways.
B. Increasing oxidative damage to cellular components.
C. Improving glucose metabolism and insulin sensitivity.
D. Reducing the body's ability to manage energy efficiently.

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11. Which process, promoted by hormetic stressors, helps in the maintenance of cellular homeostasis and function by degrading and recycling damaged cellular components?

A. Mitochondrial biogenesis
B. Neuroplasticity
C. Autophagy
D. Telomerase activation

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12. How does hormesis contribute to improved metabolic health?

A. By enhancing insulin sensitivity and optimizing glucose metabolism
B. By decreasing mitochondrial biogenesis
C. By increasing chronic inflammation
D. By reducing antioxidant defenses

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13. What role does Nrf2 play in the body's response to hormetic stress?

A. Nrf2 helps in the upregulation of heat shock proteins
B. Nrf2 promotes the expression of antioxidant and detoxification enzymes
C. Nrf2 activates inflammatory pathways
D. Nrf2 decreases mitochondrial biogenesis

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14. In the context of physical therapy practice, what is the recommended initial exercise intensity for integrating aerobic hormetic stress?

A. High intensity (70-90% of maximum heart rate)
B. Low intensity (30-50% of maximum heart rate)
C. Moderate intensity (50-70% of maximum heart rate)
D. Very low intensity (10-30% of maximum heart rate)

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15. Which of the following best describes the impact of hormetic stressors on neuroprotection and cognitive function?

A. They reduce neuroplasticity and the production of brain-derived neurotrophic factor (BDNF)
B. They enhance neuroplasticity and cognitive function by stimulating BDNF production
C. They decrease the body's ability to adapt to stress by reducing cognitive function
D. They increase pro-inflammatory cytokines that negatively impact brain health

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16. Which of the following accurately describes the primary mechanism through which cold exposure acts as hormetic stress in physical therapy?

A. Cold exposure increases blood flow by causing vasoconstriction, which enhances circulation in injured tissues.

B. Cold exposure reduces inflammation by vasoconstriction, limiting swelling and inflammatory mediator production.
C. Cold exposure enhances muscle strength by triggering the production of new muscle fibers through a numbing effect.
D. Cold exposure improves oxygen utilization by increasing red blood cell production and reducing muscle spasms.

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17. When integrating High-Intensity Interval Training (HIIT) into physical therapy, how should the intensity of the high-intensity intervals be structured for an effective program?

A. High-intensity intervals should be performed at 60-75% of the individual's maximum heart rate for 1-3 minutes.
B. High-intensity intervals should be performed at 70-85% of the individual's maximum heart rate for 2-4 minutes.
C. High-intensity intervals should be performed at 80-95% of the individual's maximum heart rate for 30 seconds to 4 minutes.
D. High-intensity intervals should be performed at 85-100% of the individual's maximum heart rate for 5-10 minutes.

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18. Which of the following methods best integrates heat exposure into physical therapy to induce hormetic stress?

A. Applying hot packs directly on the skin of the affected area for 5-10 minutes.
B. Using warm baths at 110°F for 20-30 minutes, performed twice daily.
C. Spending 10-20 minutes in a sauna 2-3 times per week to enhance systemic circulation and promote relaxation.
D. Using infrared therapy for 5-10 minutes twice a week to reduce muscle tension and increase tissue stretchability.

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19. Which combination of parameters would be safe to start with for a patient beginning intermittent hypoxic training (IHT) integrated into their physical therapy regimen?

A. 10 sessions per week with 10-second breath-holds followed by 30-second normal breathing.
B. 2-3 sessions per week with 15-30 second breath-holds followed by 1-2 minutes of normal breathing.
C. 4-5 sessions per week with 1-minute breath-holds followed by 30-second normal breathing.
D. Once per week with 5-minute breath-holds followed by 5-minute normal breathing.

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20. Which of the following assessments would best measure the effectiveness of integrating hormetic stressors like HIIT and heat exposure in a physical therapy plan?

A. Recording only self-reported pain levels before and after therapy sessions.
B. Measuring exercise capacity through standardized tests, heart rate variability, and subjective pain levels.
C. Tracking only the ratio of high to low-intensity intervals completed during HIIT sessions.

D. Assessing muscle mass and fat percentage exclusively using bioelectrical impedance analysis.
