Endocrine Stress Reactivity Associated with Extreme Sports: Hormones Talk

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Stress
Exercise Stress

Physiological Adjustment

CATECHOLAMINES
SNS Neuron

PHYSIOLOGICAL CHANGES SUPPORTING "FIGHT OR FLIGHT" RESPONSES
Purpose

To provide an overview of the endocrine responses to a variety of extreme sports stressors and examine the potential health and wellbeing consequences associated with these responses.
Ultra-Endurance Sports

Extreme Mental Stress
Ultra-Endurance Sports
Ultra-marathon

Ironman

High Altitude Expeditions

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Testing Site</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>PRE-I</td>
</tr>
<tr>
<td>TSH (uIU · ml⁻¹)</td>
<td>1.63 ± 0.14</td>
</tr>
<tr>
<td>TT4 (nmol · L⁻¹)</td>
<td>138.1 ± 3.9</td>
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<tr>
<td>fT4 (pmol · L⁻¹)</td>
<td>15.2 ± 0.5</td>
</tr>
<tr>
<td>TT3 (nmol · L⁻¹)</td>
<td>3.8 ± 0.2</td>
</tr>
<tr>
<td>fT3 (pmol · L⁻¹)</td>
<td>4.3 ± 0.2</td>
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<tr>
<td>rT3 (nmol · L⁻¹)</td>
<td>0.26 ± 0.02</td>
</tr>
<tr>
<td>Cortisol (nmol · L⁻¹)</td>
<td>139.3 ± 9.1</td>
</tr>
</tbody>
</table>

High Altitude Expeditions

Extreme Mental Stress
Skydiving

Other Sports?
Summary

- Ultra-endurance Sports
- Hormonal response \( \propto \) metabolic load
- Environmental conditions
- Affective state
- Disruptions persist into recovery (hours/days)
- Extreme Mental Stress
- Allostery load
- Disruptions transient
- Hormonal response \( \propto \) metabolic load
Conclusions

- Limited research
- Extreme sports provoke
  - Stress hormone reactivity
  - Relative to the specific type of activity
- Medical implications
  - Endocrine reactivity could exacerbate medical conditions
  - Caution may be advised for some activities
Future Applications

“Fear is an incredibly strong emotion. If something scares us, the body immediately releases **endorphins**, **dopamine** and **norepinephrine**. Endorphins mitigate pain, dopamine and norepinephrine are performance enhancers. There haven’t been direct studies on so-called action sports, but the general scientific thinking is that the more fearful a certain sport makes you, the greater the release of these chemicals. The greater the release of these chemicals, the greater the **addiction-like symptoms**.”
Acknowledgements

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Ms. Amy R. Lane, MA