Heat stress, with its physiological and behavioral consequences, increases the risks of rumen acidosis.

Environmental stressors  
(work, home, neighborhood)  

Major life events

Perceived stress  
(threat, helplessness, vigilance)  

Trauma, abuse

Behavioral responses  
(fight or flight; personal behavior — diet, smoking, drinking, exercise)

Physiologic responses

Individual differences  
(genes, development, experience)

Allostasis  
Adaptation  
Allostatic load
PHYSIOLOGY SYSTEMS - STRESS

- Nervous system
  - Central nervous system (Brain and Spinal cord)
  - Peripheral nervous system (All neural pathways to extremities)

- Endocrine system

- Immune system
SYMPATHETIC AND PARASYMPATHETIC SYSTEM

Sympathetic
- Dilates pupil
- Inhibits salivation
- Accelerates heart
- Stimulates glucose release by liver
- Secretion of epinephrine and norepinephrine from kidney
- Relaxes bladder

Parasympathetic
- Constricts pupils
- Stimulates salivation
- Inhibits heart
- Constricts bronchi
- Stimulates digestive activity
- Stimulates gallbladder contraction
- Contracts bladder
- Relaxes rectum
ENDOCRINE RESPONSE TO STRESS

STRESS activates HPA AXIS

• CRH acts at the anterior pituitary to trigger release of adrenocorticotrophic hormone (ACTH) which acts at the adrenal cortex to stimulate the synthesis and release of glucocorticoids.

• Glucocorticoids themselves have myriad effects within the body, but their actions can be summarized in the very short term as promoting energy use, increasing cardiovascular activity (in the service of the flight-or-fight response), and inhibiting functions such as growth, reproduction, and immunity.
<table>
<thead>
<tr>
<th>Nucleus</th>
<th>Zone(s)</th>
<th>Region(s)</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paraventricular</td>
<td>Periventricular, Medial</td>
<td>Anterior, Tuberal</td>
<td>Fluid balance, milk let-down, parturition, autonomic &amp; anterior pituitary control</td>
</tr>
<tr>
<td>Preoptic</td>
<td>Medial, Lateral</td>
<td>Anterior</td>
<td>Lateral anterior thermoregulation, sexual behavior</td>
</tr>
<tr>
<td>Anterior</td>
<td>Medial</td>
<td>Anterior</td>
<td>Lateral anterior thermoregulation, sexual behavior</td>
</tr>
<tr>
<td>Suprachiasmatic</td>
<td>Medial</td>
<td>Anterior</td>
<td>Biological rhythms</td>
</tr>
<tr>
<td>Supraoptic</td>
<td>Medial, Lateral</td>
<td>Anterior</td>
<td>Fluid balance, milk let-down, parturition</td>
</tr>
<tr>
<td>Dorsomedial</td>
<td>Medial</td>
<td>Tuberal</td>
<td>Emotion (rage)</td>
</tr>
<tr>
<td>Ventromedial</td>
<td>Medial</td>
<td>Tuberal</td>
<td>Appetite, body weight, insulin regulation</td>
</tr>
<tr>
<td>Arcuate</td>
<td>Periventricular, Medial</td>
<td>Tuberal</td>
<td>Control of anterior pituitary, feeding</td>
</tr>
<tr>
<td>Posterior</td>
<td>Medial</td>
<td>Posterior</td>
<td>Thermoregulation</td>
</tr>
<tr>
<td>Mammillary</td>
<td>Medial</td>
<td>Posterior</td>
<td>Emotion and short-term memory</td>
</tr>
<tr>
<td>Lateral Complex</td>
<td>Lateral</td>
<td>Tuberal</td>
<td>Appetite and body weight control</td>
</tr>
</tbody>
</table>