**Neurobiological responses during an intense call:**

The brain is in a state of heightened alert due to the activation of the sympathetic nervous system (fight-or-flight response).

**Amygdala**: the "lights and the sirens" in the brain is in charge of emotional processing as well as fear and threat detection. This remains highly active during the call.

- May continue to signal danger after the call is over
- The brain's emotional centers (amygdala and limbic system) continue to process the emotional significance of the event, and these emotions may not be fully felt until later

**Hippocampus**: helps the brain process and store the events of the call including consolidating and integrating the memories.

- Impairment of Hippocampus: fragmented or intrusive memories
- Impairment of memories and emotional regulation

**Prefrontal Cortex (PFC)**: helps the firefighter make quick, life-or-death decisions, problem-solve, and manage complex tasks. It remains highly active during a call and is responsible for decision-making, reasoning, and executive functioning.

- PFC may remain "on" leading to stress and rumination

**Release of Cortisol and Adrenaline**

To allow the firefighter to stay alert, focused, and physically ready to handle a call, the brain signals the adrenal glands to release adrenaline (epinephrine) and cortisol.

**Adrenaline**: increases heart rate, blood flow to muscles, and alertness.

- slowly dissipates
- jittery, restless, or on edge.

**Cortisol**: a stress hormone, remains elevated for longer periods after the call.

- Disrupts sleep
- Impair immune system
- Can lead to anxiety and depression
- The lingering effects of adrenaline and cortisol can make it difficult for firefighters to "turn off" their minds and bodies, leading to insomnia or poor sleep quality.
- The transition to get the brain and body back to a more relaxed state, can take time.

**Emotional Reactions**

After a call, the brain shifts from immediate problem-solving and action to processing the events emotionally and cognitively. This phase can involve intense reflection, emotional release, or even detachment.

- Brain may have difficulty processing the event
- May re-experience certain aspects of the call because it is trying to make sense of it (Intrusive thoughts, rumination, and flashbacks)
- May experience frustration, sadness, guilt, regret, self-blame, or distress

**Sleep and Recovery**

The brain requires sleep to consolidate memories and recover from the high levels of stress hormones, but many firefighters struggle to achieve quality sleep after a call

- At times, the traumatic events of a call may manifest in nightmares, as the brain struggles to process the emotional content of the experience

**Resilience in Relationships**

- Communication and Openness
- Fostering Intimacy
- Emotional Connection
- Adaptability
- Seek Support
- Avoiding Burnout
- Self-care Routines
- Stress Management