

- Glutamine is now known to be 'conditionally essential' in states of serious illness or injury.
- In catabolic states, large amounts of amino acids including glutamine are released from muscle tissue.
- One described hypothesis for the release of glutamine following stress is that glutamine provides a vital fuel source for enterocytes of the small bowel, rapidly dividing leukocytes and macrophages in the immune system, for its essential role in nucleic acid synthesis, and for acid-base homeostasis in the kidney.
- serves a role as a signaling molecule in states of illness and injury
- regulates the expression of many genes related to metabolism, signal transduction, cell defense and repair, and to activates intracellular signaling pathways

Table 1 Proposed molecular mechanisms by which glutamine may improve outcome in critical illness

	Mechanism
Tissue protection	Enhanced HSP expression [21**,22-24,26,27*,28**,29**,35,42] Attenuated gut barrier dysfunction [30**] Decreased cellular apoptosis [29**,32*,33*,34**]
Anti-inflammatory/immune regulation	Attenuation of cytokine release [25,29**,36,38,37**,38*] Attenuation of nuclear factor κ B/stress kinase activation [37**]
Preservation of tissue metabolic function in stress states	Preservation of ATP levels following sepsis and ischemia/reperfusion injury [27*,28,40]
Antioxidant/attenuation of iNOS expression	Enhanced GSH levels following stress [40,41] Attenuation of iNOS activation following sepsis and ischemia/reperfusion injury [37**,42]

HSP, heat shock protein; GSH, glutathione.

pathophysiology of glutamine in critical illness

Glutamine

general

- Initial clinical data from over the past 15 years have begun to show that glutamine may be beneficial in improving outcomes in clinical trials of critically ill patients.

Burn Injuries

- There are some trial data which indicate that glutamine supplementation decreases bacteraemia, gram negative infections, mortality and length of hospital stay in this population (doses vary but highest used is 0.5g/kg enteral)

- metaanalysis in critical illness reveals that a statistically significant effect of glutamine reducing mortality in critical illness is observed (RR 0.76, 95% CI 0.56-0.98)

Figure 1 Effect of glutamine administration on mortality in critically ill patients

