Stress response does not inhibit sepsis-induced muscle proteolysis

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Background
Sepsis is a serious complication following, surgery and major trauma and remains a leading cause of death in surgical intensive care units. Patients with sepsis suffer significant loss of body protein, mainly reflecting protein breakdown in skeletal muscle.
The stress (heat shock) response, characterized by the induction of so-called heat shock proteins, exerts a protective effect against various noxious influences in cells and tissues. The effect of the stress response on sepsis-induced muscle catabolism is not known. We tested the hypothesis that the stress response inhibits muscle breakdown during sepsis.

Methods
Stress response was induced in mice and rats by injection of different amounts of sodium arsenite (7.5 - 25 mg/kg) (control animals were injected with normal saline) or by exposing animals to hyperthermia (42°C for 3 min) (control animals were exposed to room temperature). Two hours after the induction of stress response, sepsis was induced by cecal ligation and puncture (CLP). Other animals underwent sham operation. Sixteen hours later, protein breakdown rate was determined in incubated extensor digitorum longus (EDL) muscles by measuring the net release of tyrosine by HPLC. Stress response was measured independent of CLP by harvesting, EDL muscles at various time points and performing Western blotting for the presence of the 72kDa heat shock protein (HSP-72).

Results
EDL levels of HSP-72 increased after hyperthermid (HT) or treatment with sodium arsenite (SA), consistent with the induction of the stress response (Fig). The increase in muscle protein breakdown was not blunted by the stress response (Table).

NOTE: THIS SPACE HAD FIGURES OR GRAPHS WHICH GOT CORRUPTED DURING THE SCAN.

Western Blot for HSP-72

	C	HT	SA 10 mg/kg
HSP-72--->			

Total Protein Breakdown

Tyrosine Release (nmoVg*2h)

	Sham	CLP
Saline	410.96 + 94.32	517.96 + 94.13
HT	495.42 + 97.10	670.46 + 101.3
SA	517.48 + 58.21	570.35 + 63.60

Conclusions
These results suggest that the stress response does not inhibit sepsis-induced skeletal muscle proteolysis.