



# Severe Remote Burn Injury Results in Early, Elevated Markers of Alzheimer's Disease



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## INTRODUCTION

Prior studies have found that patients with severe burns may suffer neurocognitive decline. While these observations are frequently attributed to psycho-social causes, our lab recently reported that remote burn injury is associated with significant brain changes, including new data revealing a substantial, rapid, and sustained (30 min - 45 day) increase in rat brain inflammation following remote burns. Other acute brain injury processes, such as traumatic brain injury (TBI) and stroke have been associated with an accelerated accumulation of A $\beta$ 40, A $\beta$ 42, and Tau, and ultimately a clinical picture of early-onset Alzheimer's disease (AD)

## HYPOTHESIS

We hypothesized that AD-like processes may be triggered in the indirect brain injury following remote, severe burns, similar to that seen with direct brain injury (TBI and stroke)

## METHODS

52 male rats were randomized into 2 groups:

- 1) sham burn (n= 8)
- 2) burn (n=44)

Burned rats received a 40% 3° TBSA dorsal scald burn, and fluid resuscitation with Lactated Ringer's solution

8 animals from the burn group were sacrificed at 0.5,1,2,4,6,8,12,24 hours and 7 days, with 4 sacrificed at 45 days. Brain tissue samples were analyzed by ELISA for cytokines, A $\beta$  40, A $\beta$  42, Tau and phospho-Tau

## RESULTS

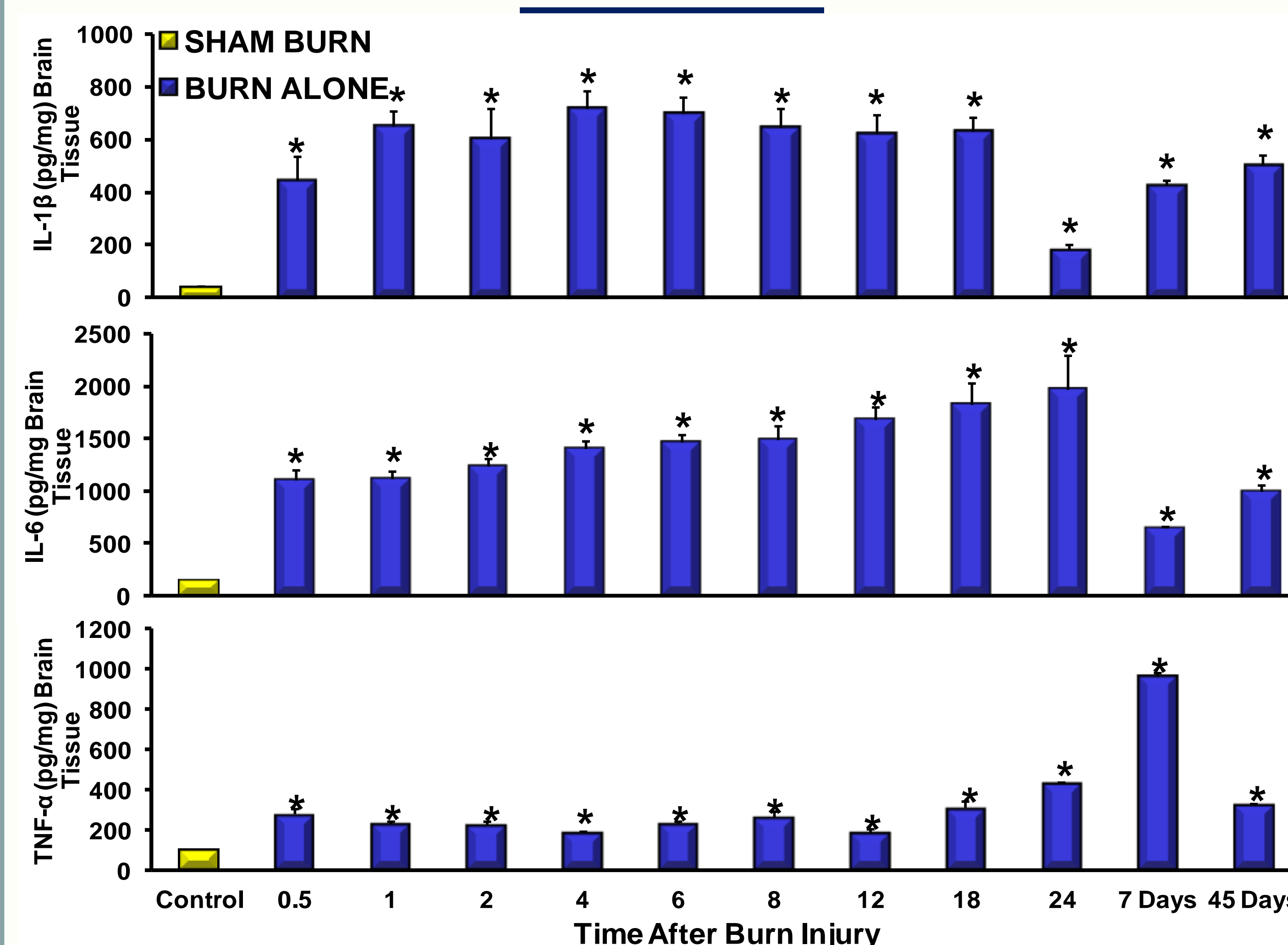


Figure 1. All measured pro-inflammatory cytokines were elevated up to 45 days in the brain after remote severe burns

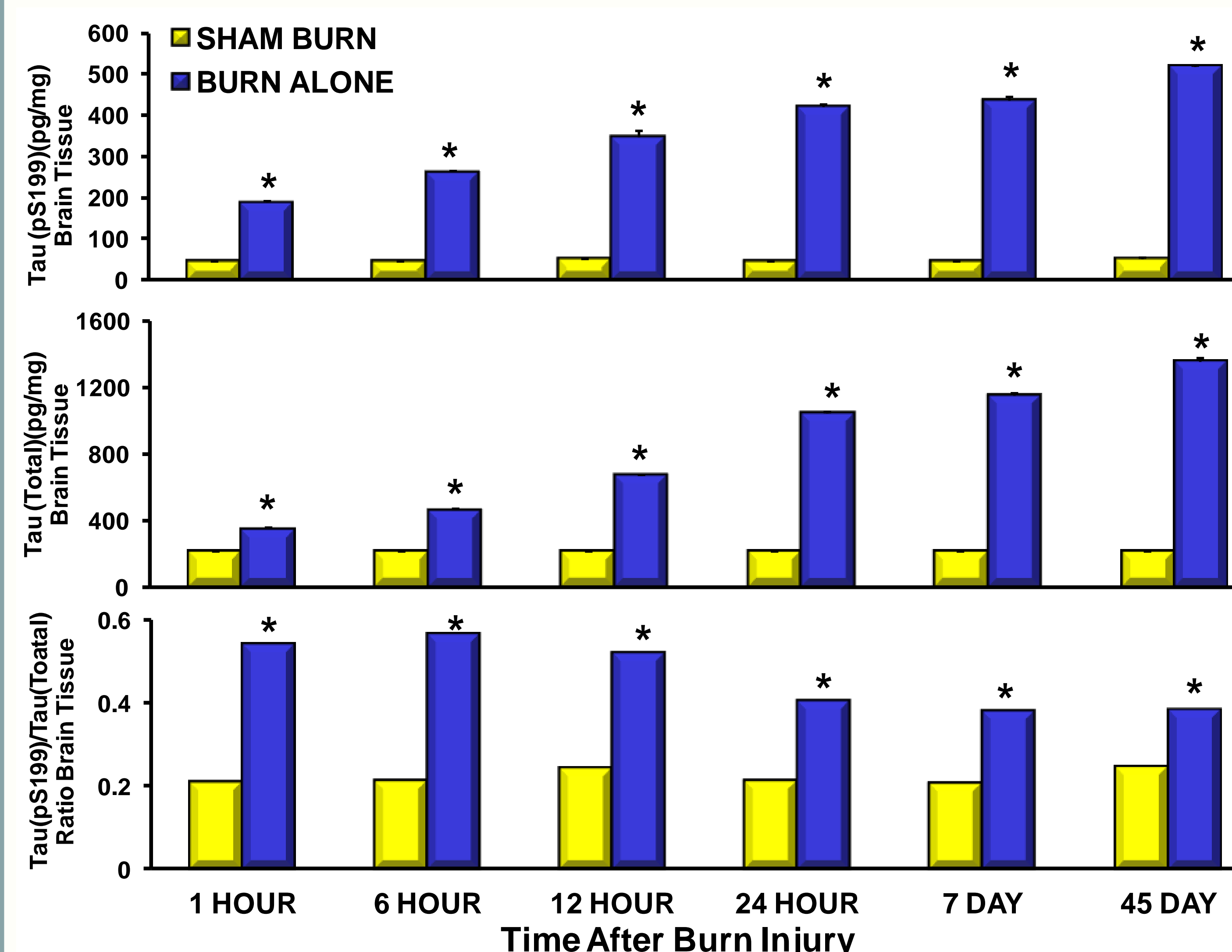


Figure 2. Brain levels of Tau and phospho-Tau were elevated for up to 45 days after remote severe burns

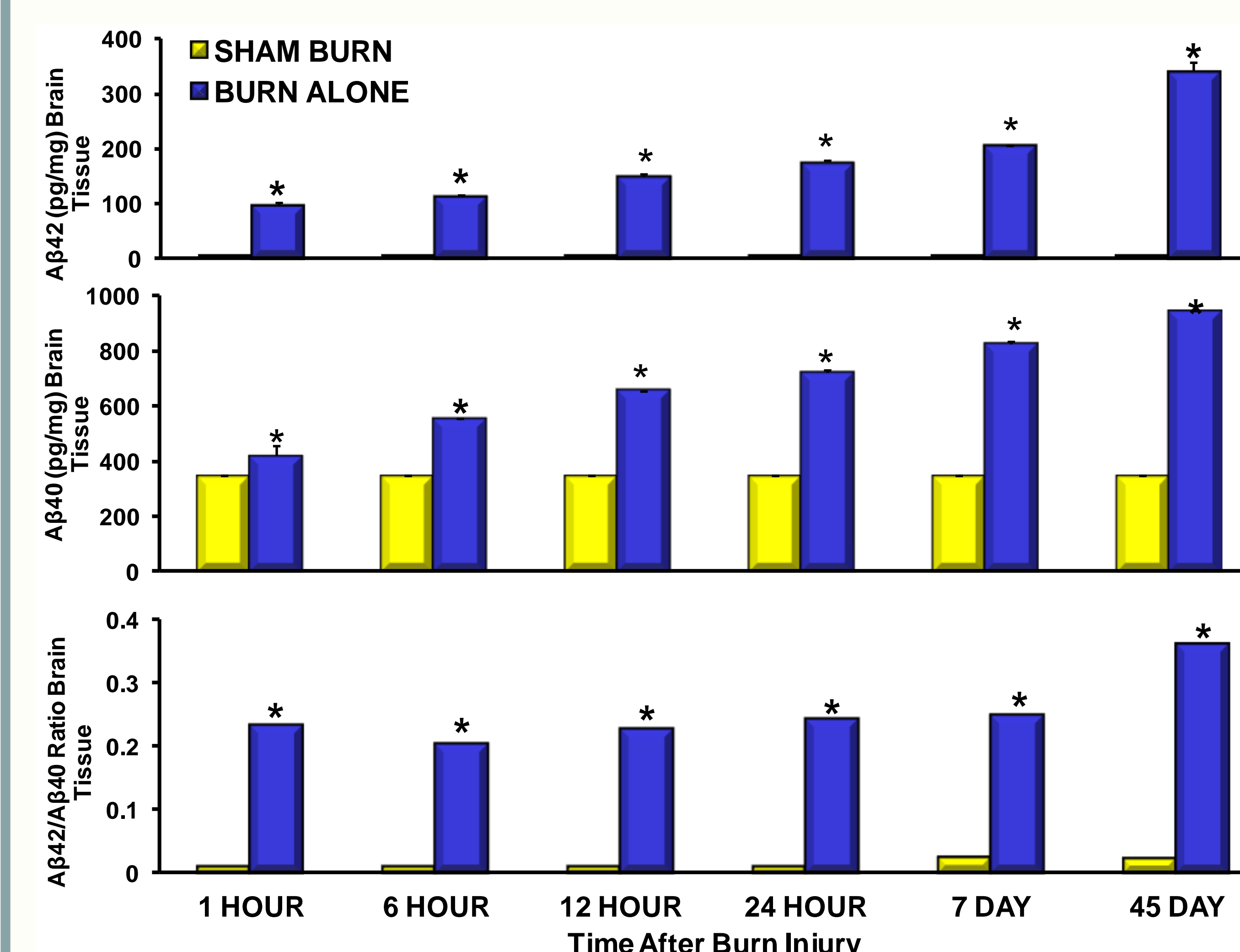


Figure 3. Brain levels of A $\beta$ 40 and A $\beta$ 42 were elevated for up to 45 days after remote severe burns

## CONCLUSION

Severe remote burn injury not only results in early, robust, and sustained neuroinflammation, but also significantly increases brain levels of A $\beta$ 40, A $\beta$ 42, and Tau. This novel finding may pave the way for future brain-preserving interventional trials in burn patients, as well as provide a more rapid and effective testing-ground for new therapies aimed at slowing and/or preventing AD

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