

# Down regulation of Steroid hormone Synthesis In Skeletal Muscle of Fasted Male Rat

○Naoyuki Maeda<sup>1,2</sup>, Michiko Sato<sup>2</sup>, Junpei Fujiki<sup>2</sup>, Kanako Furuki<sup>1</sup>, Jun Teragaki<sup>1</sup>, and Hiroshi Yokota<sup>2</sup>

1.Safety Research Institute for Chemical Compounds Co.,LTD.

2.Laboratory of Veterinary Biochemistry, School of Veterinary Medicine, Rakuno Gakuen University

## Introduction

Steroid hormones were locally synthesized. However the roles of the steroids were not well understood. We developed the method for determination of steroid hormone precursors, and showed that corticosterone was synthesized in the testis and skeletal muscle of rats. In this study, we newly found that testosterone synthesis was severely down regulated but corticosterone level was increased in rat skeletal muscles by fasting. We discussed about the fundamental significance of locally synthesized steroid hormones.

## Methods

Adult male SD rats were fasted for 5 days, and other group rats were fed freely. The gastrocnemius muscle (GM), extensor digitorum longus muscle (EDL) and soleus muscle (SOL) were weighted and the levels of steroid hormones and free amino acids were determined via LC-MS/MS analysis as described in *JB Maeda et al. 2013*.

## Results & Discussion

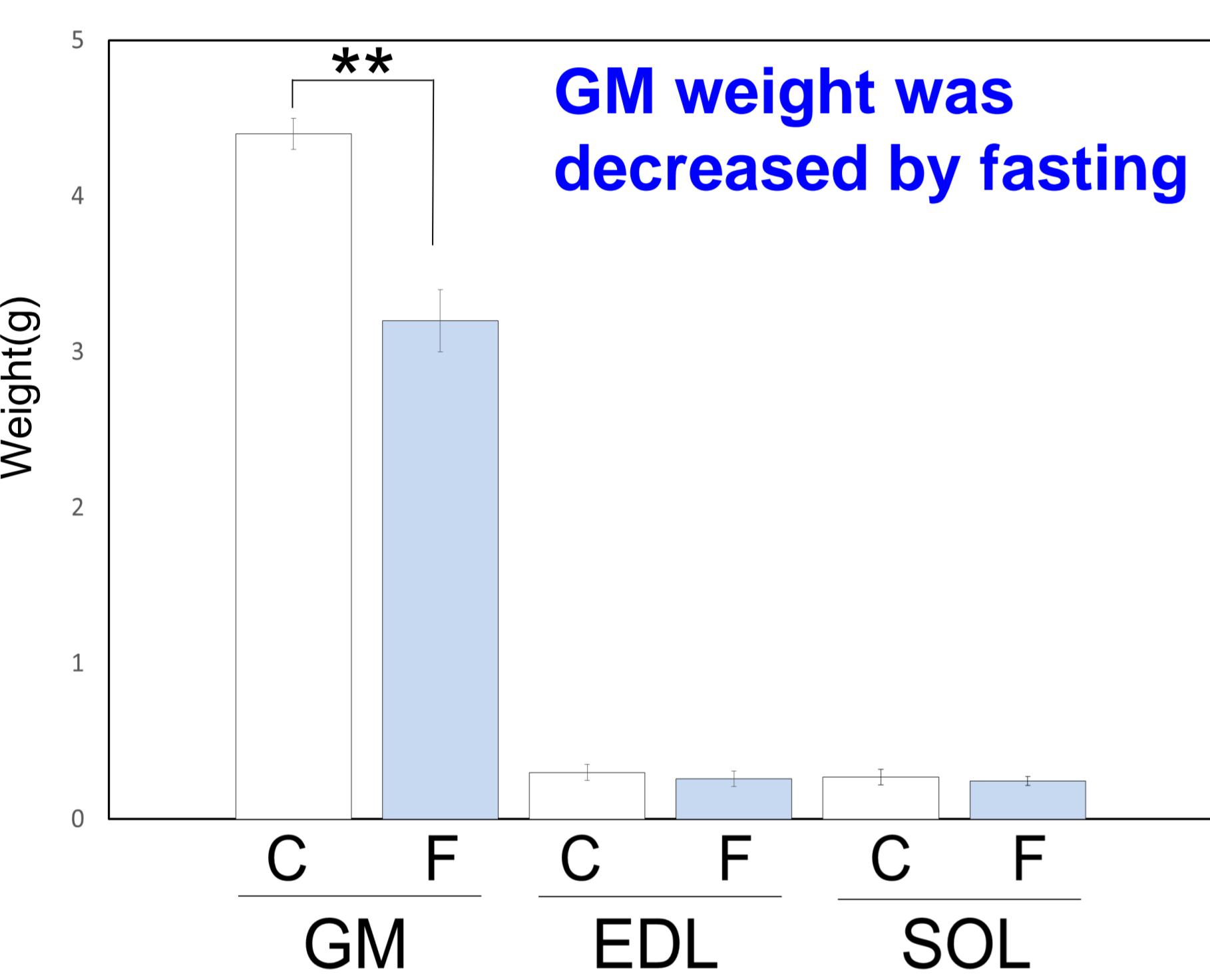
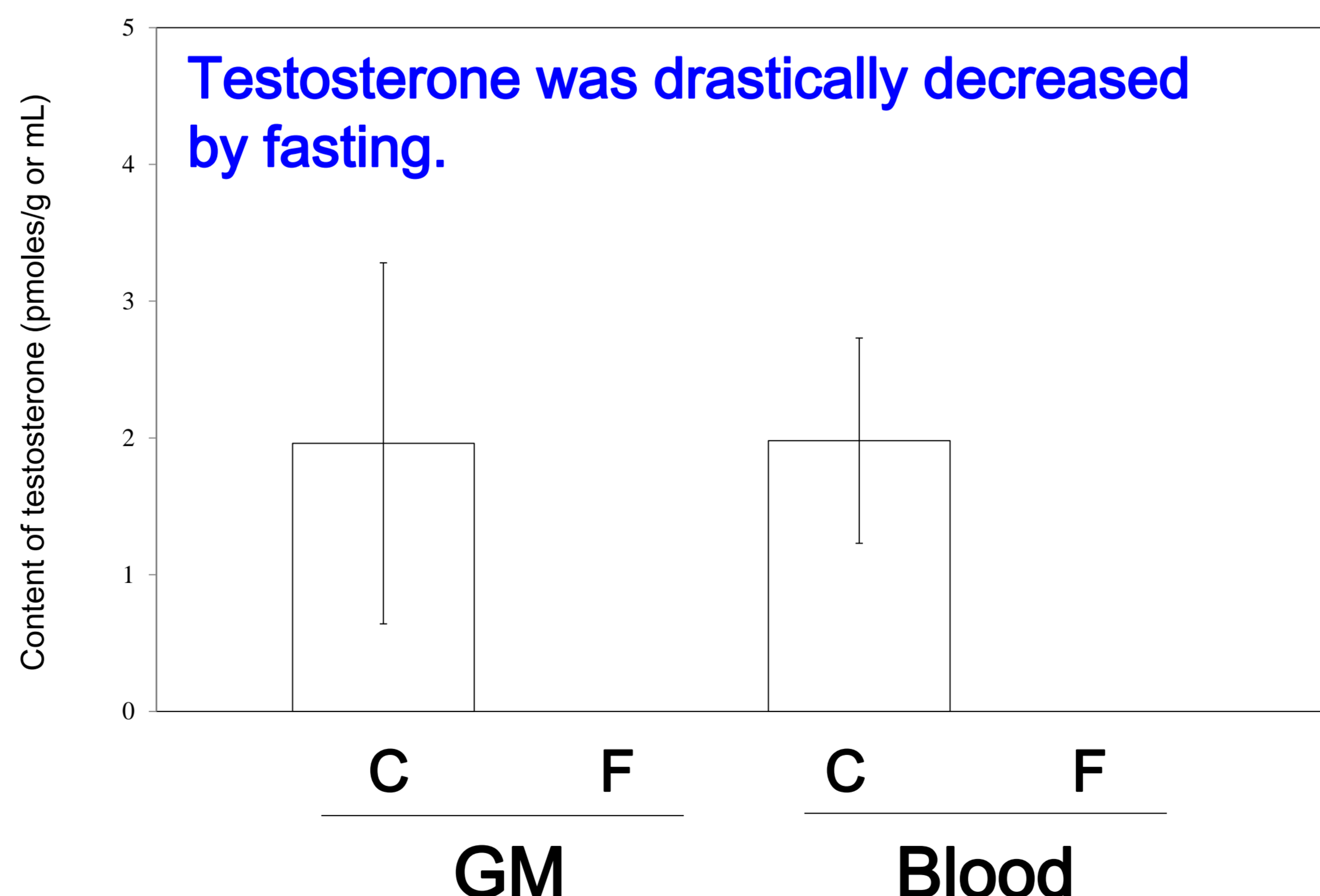
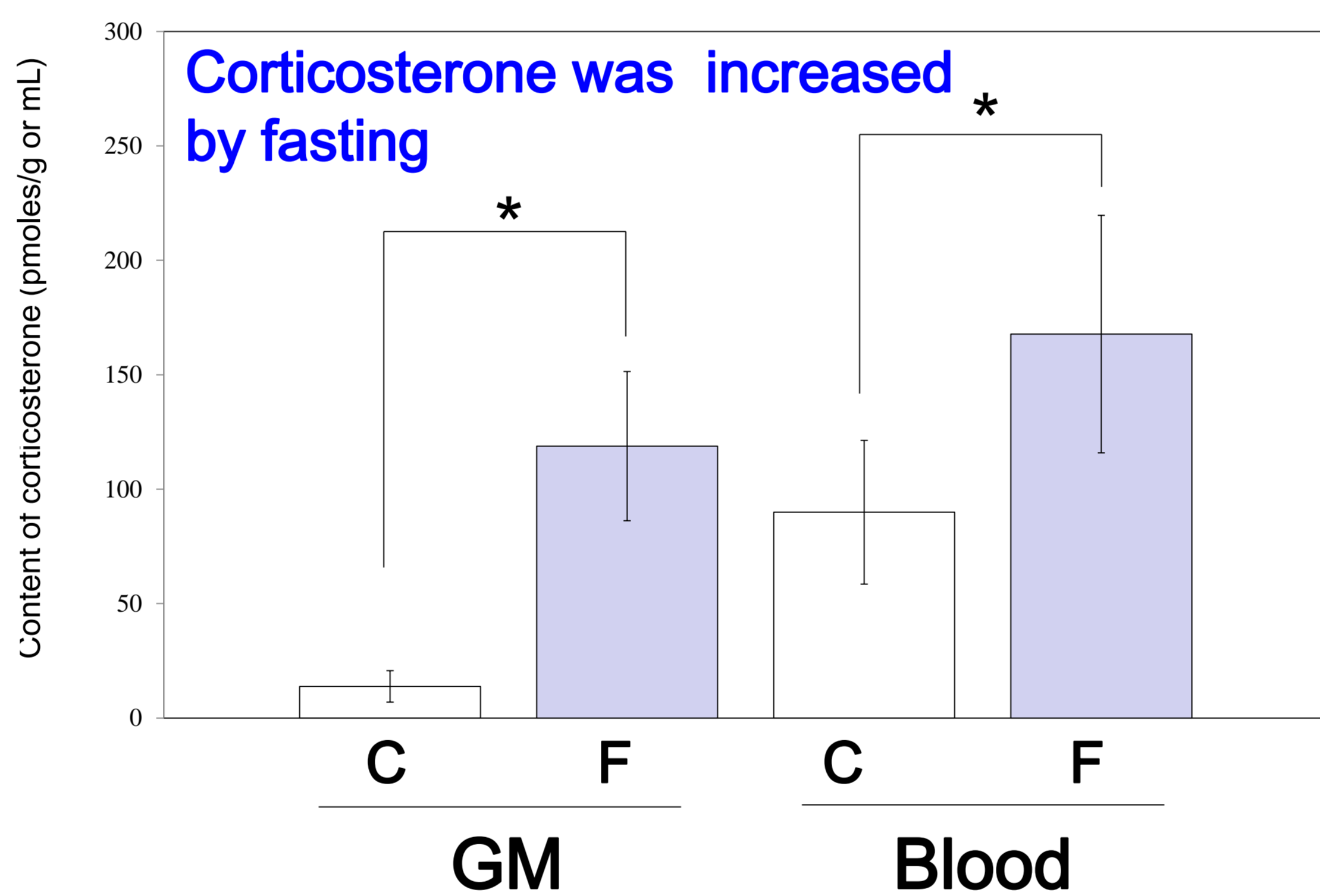
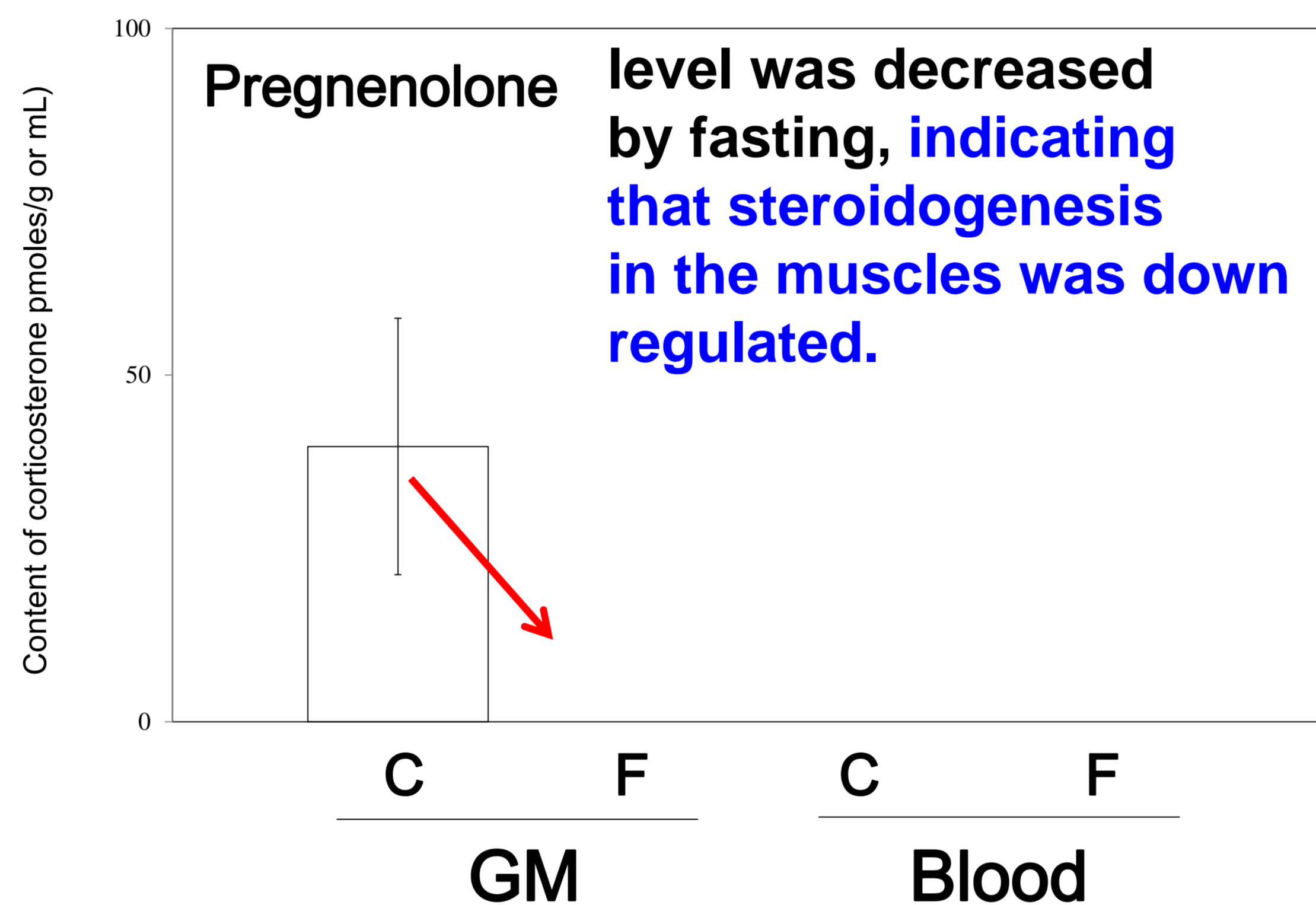


Fig.1 GM,EDL and SOL weights in control (C) and fasted (F) rats were shown. \*p<0.05 compared with controls.



BCAA in the GM was increased in the rat fasted.

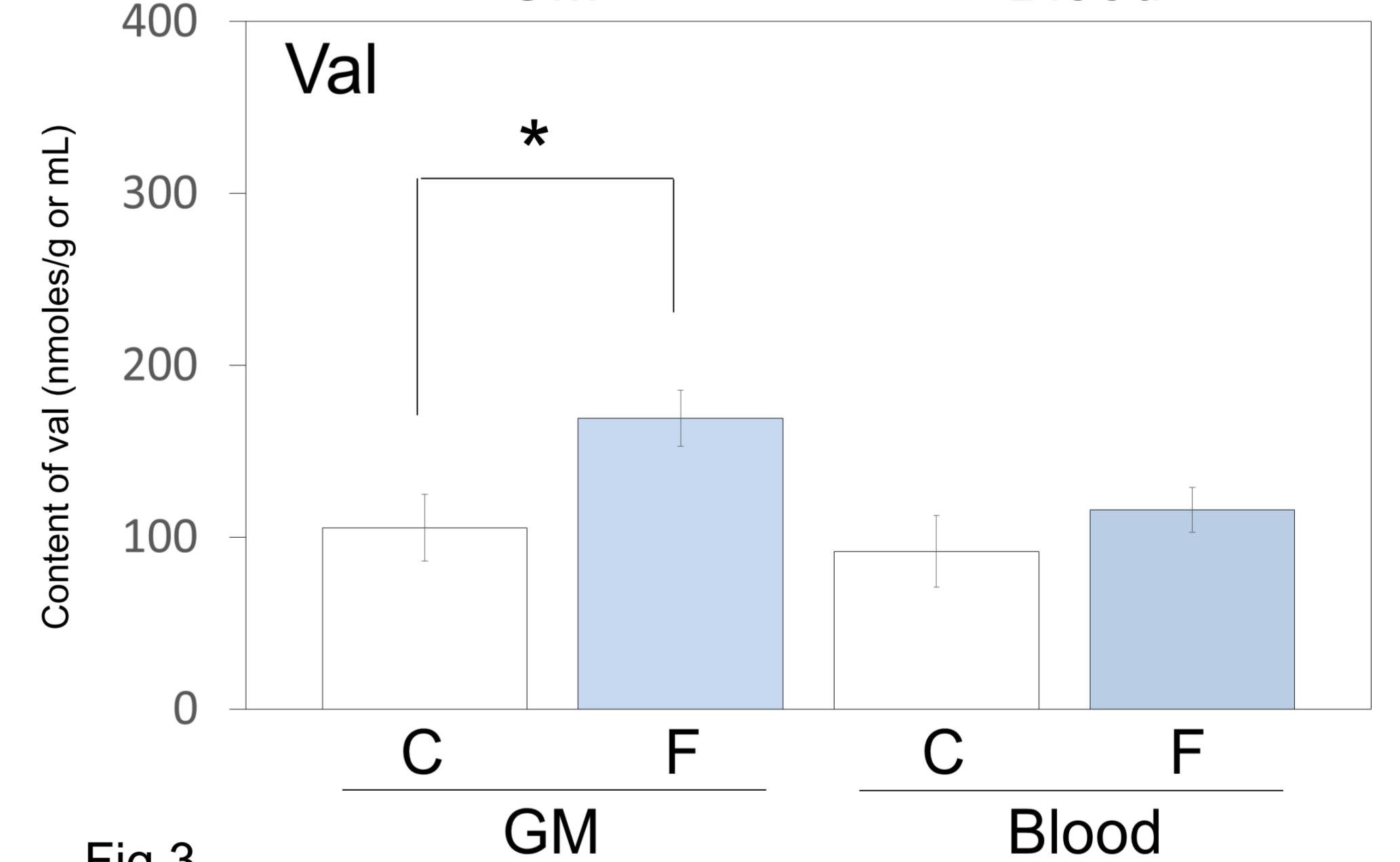
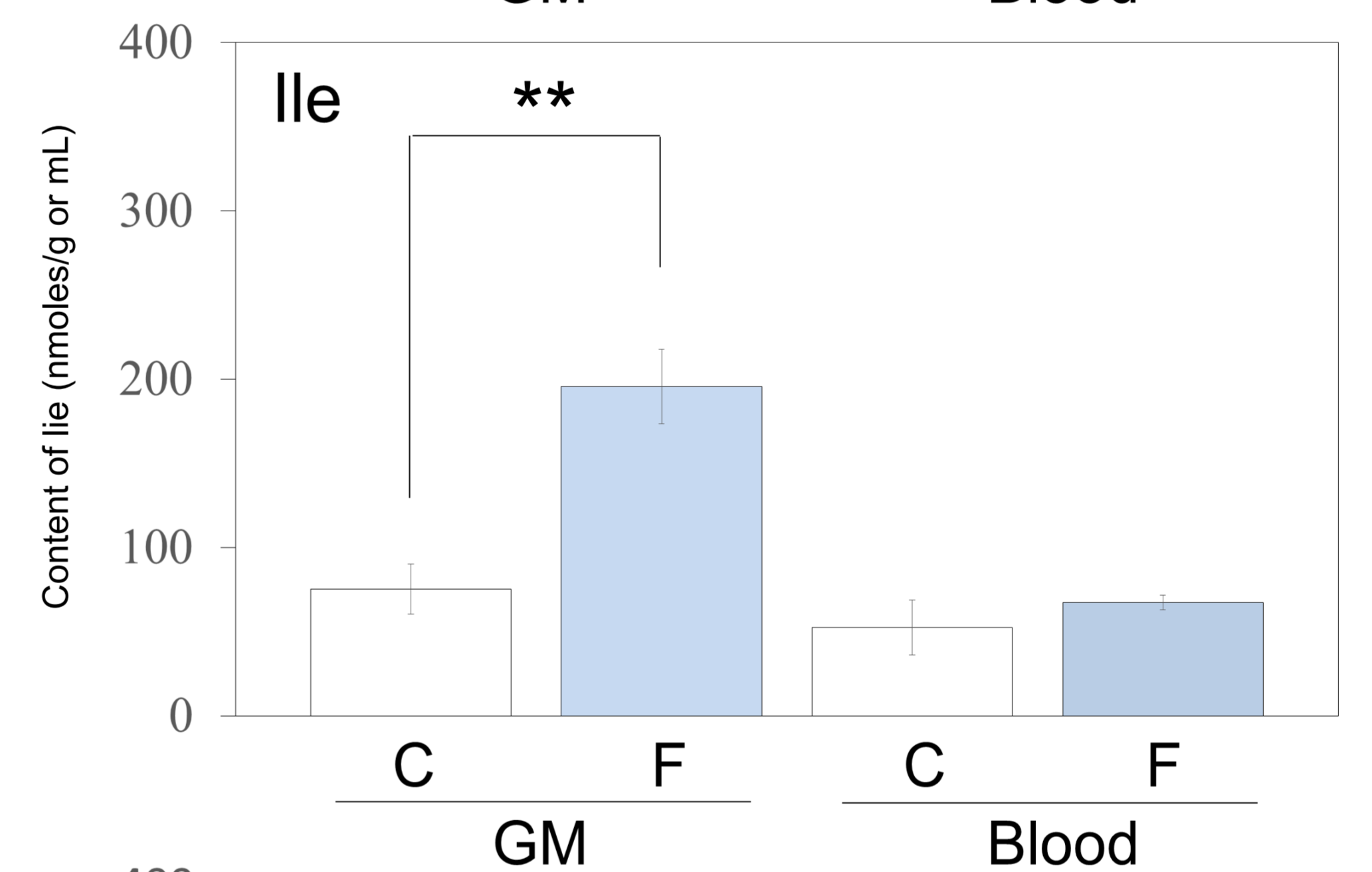
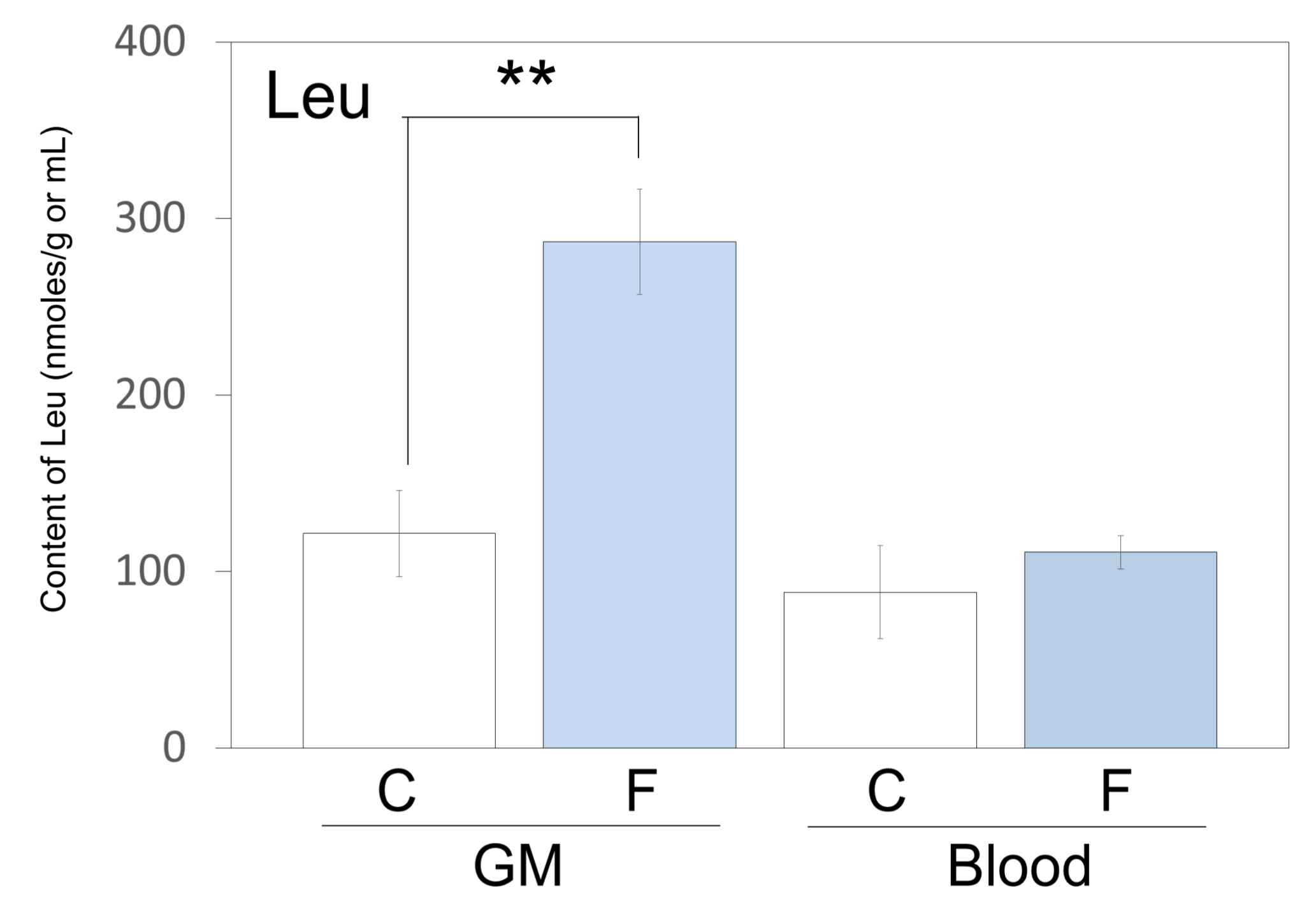


Fig.3 Levels of free branch chain amino acids (BCAA) in rat GM and blood were determined via LC-MS analysis. BCAA were not changed in the blood by fasting, however BCAA in the GM was increased in the rat fasted. \*\*p<0.01 and \*p<0.05 compared with controls.

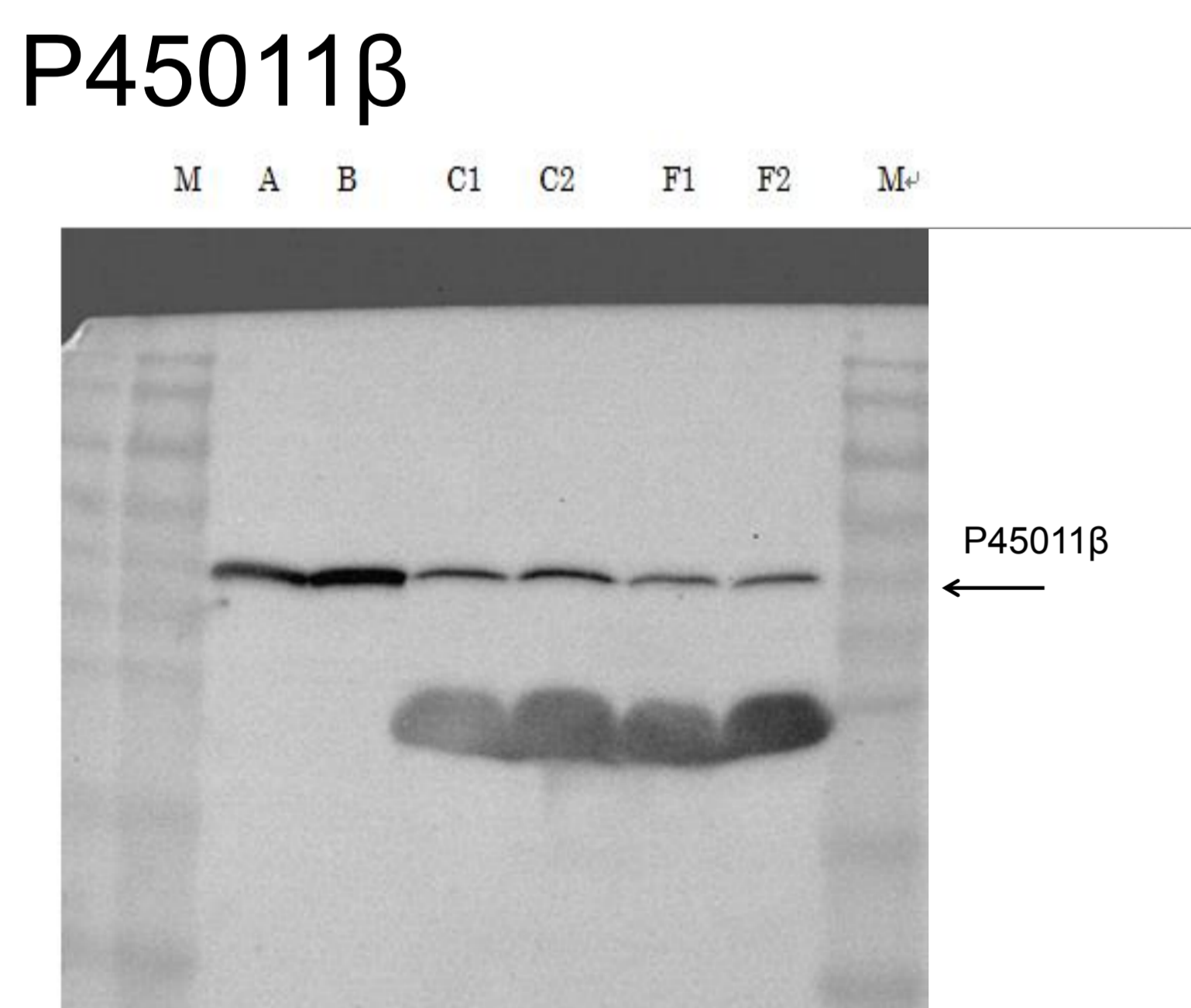
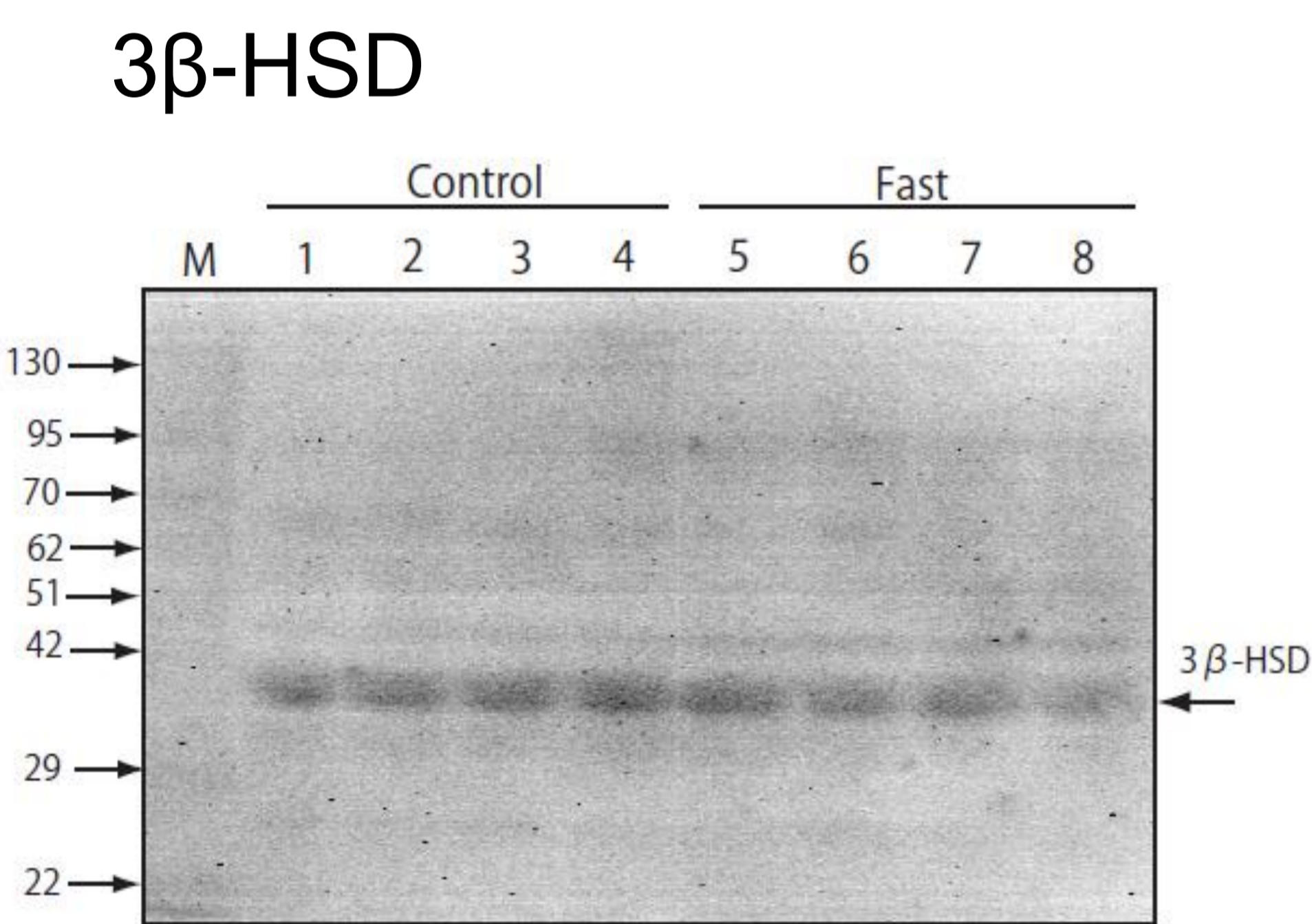


Fig.4 Western blot analysis of 3β-HSD and P45011β in the GM. Two P450s levels were not changed in the protein level and enzymatic activity by fasting.

Fig.2 Levels of corticosterone and testosterone in rat GM and blood. Two steroids in the GM and blood of control and fasted rats were determined via LC-MS analysis. The contents of testosterone was drastically decreased in the blood and GM of fasted rat, however corticosterone was increased. \*p<0.05 compared with controls.

## Conclusion

Testosterone level was drastically decreased, but corticosterone was increased in the GM of the fasted rat. BCAA level was increased only in the GM. It is suggested that might be involved with muscular cell growth locally and corticosterone be with degradation of the cells.

