



## Correction to: Preconditioning exercise reduces brain damage and neuronal apoptosis through enhanced endogenous 14-3-3 $\gamma$ after focal brain ischemia in rats

Shotaro Otsuka<sup>1</sup> · Harutoshi Sakakima<sup>1</sup> · Takuto Terashi<sup>1</sup> · Seiya Takada<sup>1</sup> · Kazuki Nakanishi<sup>1</sup> · Kiyoshi Kikuchi<sup>2,3,4,5</sup>

Published online: 17 December 2018

© Springer-Verlag GmbH Germany, part of Springer Nature 2018

### Correction to: Brain Structure and Function

<https://doi.org/10.1007/s00429-018-1800-4>

In the original publication of the article, both the Figs. 2e and 7e have been published incorrectly and the correct Figs. 2 and 7 are given below. The original article has been corrected.

---

The original article can be found online at <https://doi.org/10.1007/s00429-018-1800-4>.

---

✉ Harutoshi Sakakima  
sakaki@health.nop.kagoshima-u.ac.jp

✉ Kiyoshi Kikuchi  
kikuchi\_kiyoshi@kurume-u.ac.jp

<sup>1</sup> Course of Physical Therapy, School of Health Sciences, Faculty of Medicine, Kagoshima University, 8-35-1, Sakuragaoka, Kagoshima 890-8544, Japan

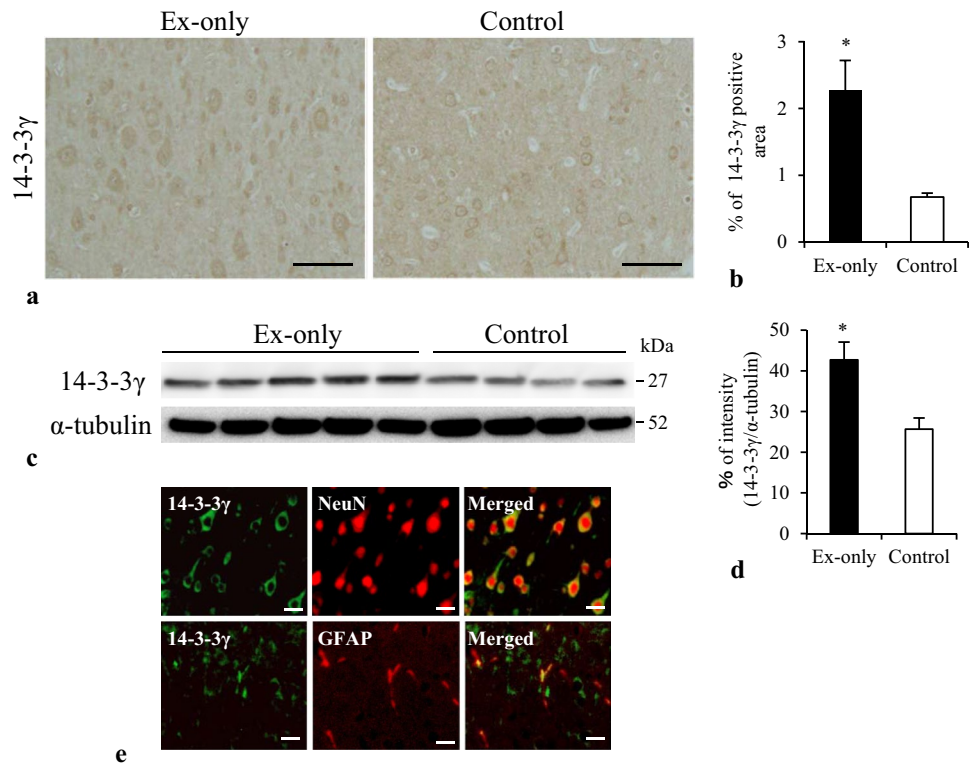
<sup>2</sup> Division of Brain Science, Department of Physiology, Kurume University School of Medicine, Kurume, Japan

<sup>3</sup> Department of Neurosurgery, Kurume University School of Medicine, Kurume, Japan

<sup>4</sup> Department of Systems Biology in Thromboregulation, Kagoshima University Graduate School of Medical and Dental Science, Kagoshima, Japan

<sup>5</sup> Department of Pharmacology, Faculty of Dentistry, Mahidol University, Bangkok, Thailand

**Fig. 2** Preconditioning exercise enhanced the expression of 14-3-3 $\gamma$  in neurons and astrocytes. 14-3-3 $\gamma$  immunoreactivity surrounding the lesion significantly increased in the Ex-only group than in the control group (**a, b**,  $n=6$ ). Representative western blotting and semi-quantitative analysis showed that protein levels of 14-3-3 $\gamma$  significantly increased in the Ex-only group than in the control group (**c, d**,  $n=5$  and 4, respectively). The 14-3-3 $\gamma$  positive cells were colocalized with NeuN or GFAP positive cells (**e**). Data are presented as mean  $\pm$  SE. \* $p < 0.05$ . Scale bar = 50  $\mu$ m (**a**) or 20  $\mu$ m (**e**)



**Fig. 7** The expression of caspase 3 and Bax surrounding the lesion after MCAO. The left side of each photomicrograph (**a**) shows an ischemic region, and the right side shows a surrounding the lesion (penumbral area). The caspase 3 and Bax immunoreactivities surrounding the lesion were significantly reduced in the Ex group (**a–c**). The caspase 3 immunopositive cells were co-localized with the neuronal marker (NeuN) and astrocyte marker (GFAP) in the Ex group (**d**), largely observed with the neuronal marker surrounding the lesion. The ratios of survival neurons (arrow) were significantly increased in the Ex group compared to that in the No-Ex group (**e**). Data are presented as mean  $\pm$  SE ( $n=7$ ). \* $p < 0.05$ . Scale bar = 50  $\mu$ m (**a**) or 20  $\mu$ m (**d**)

