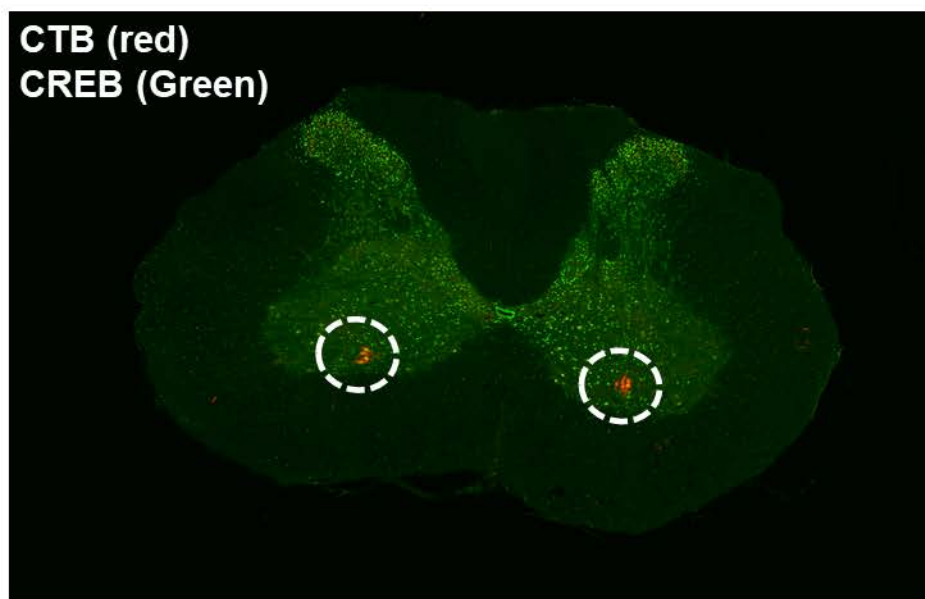


A.



B.

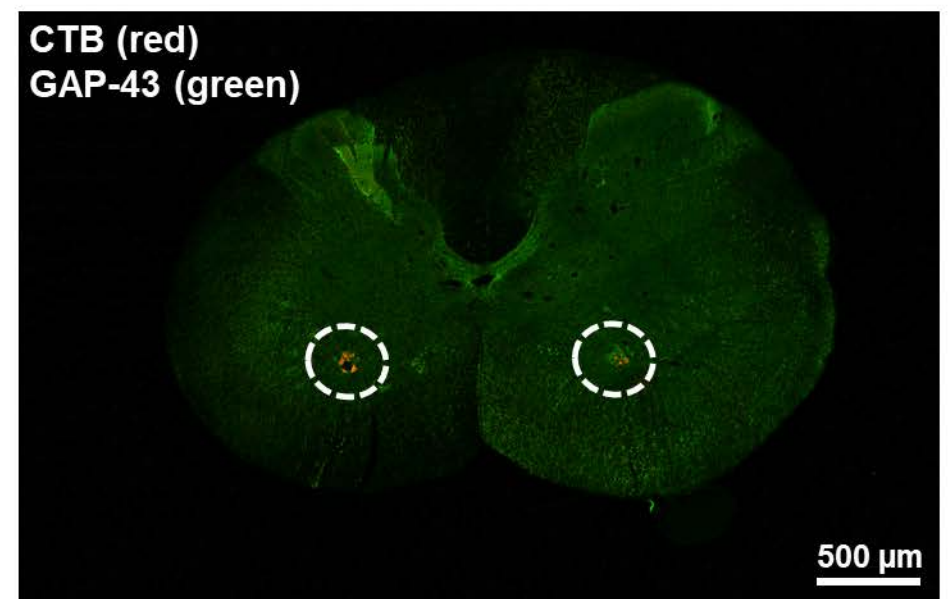
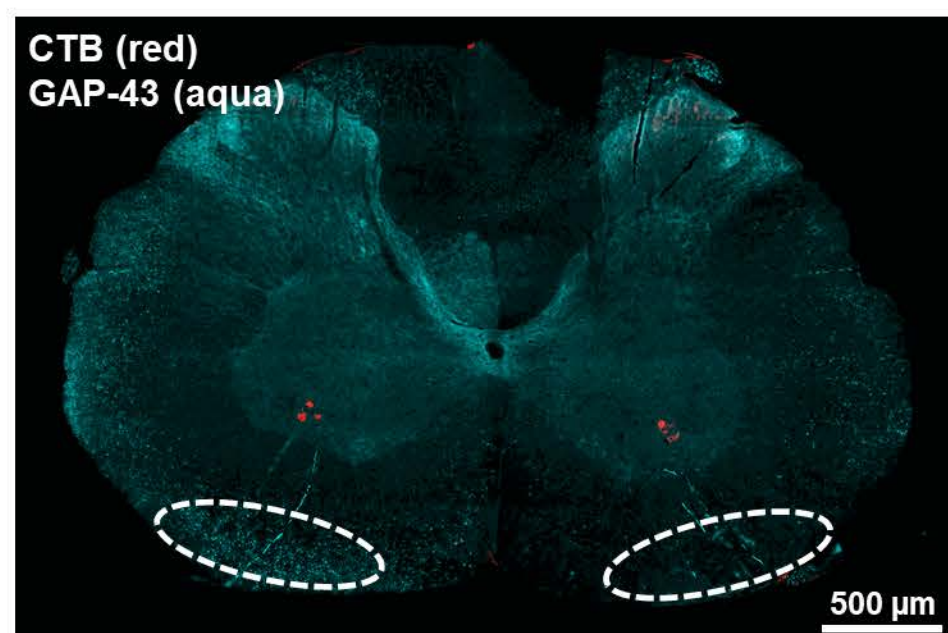
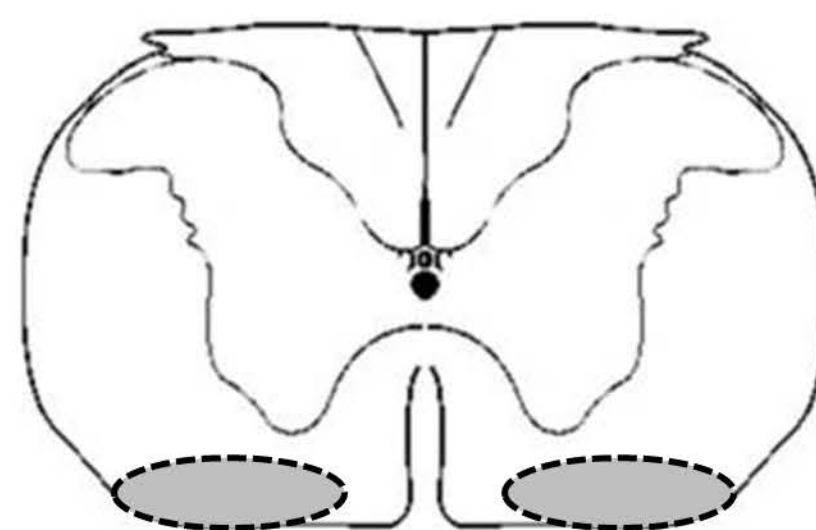


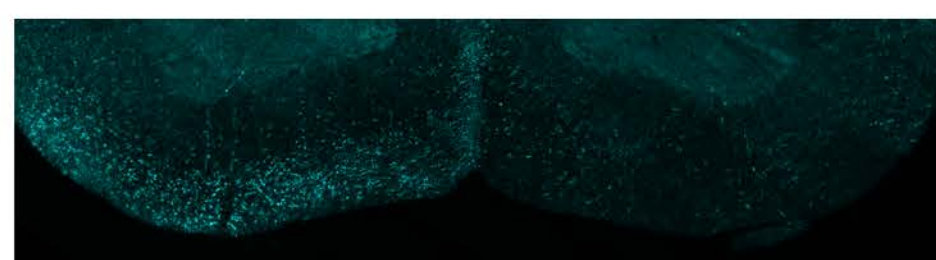
Figure S1: Representative C3-C6 spinal cord sections labeled for CTB and CREB or GAP-43

A. Representative image showing the phrenic motoneurons labeling in red and CREB labeling in green in the C3-C6 spinal cord. **B.** Representative image showing the phrenic motoneurons labeling in red and GAP-43 labeling in green in the C3-C6 spinal cord.

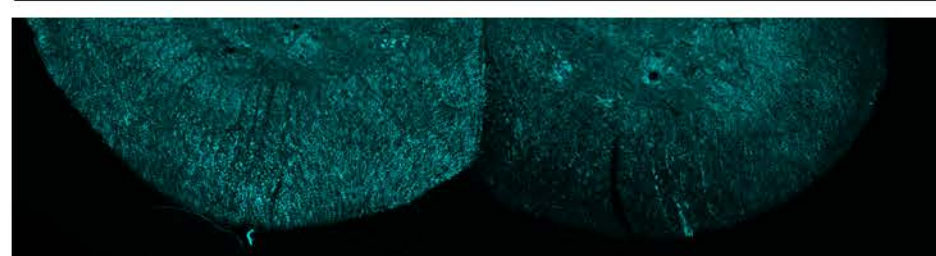
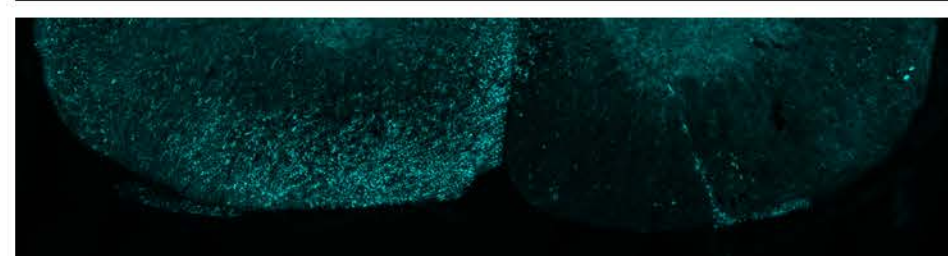
A.**B.****C.**

Sham rTMS

10Hz rTMS



7-days



1-month



2-months

Intact side

Injured side

Intact side

Injured side

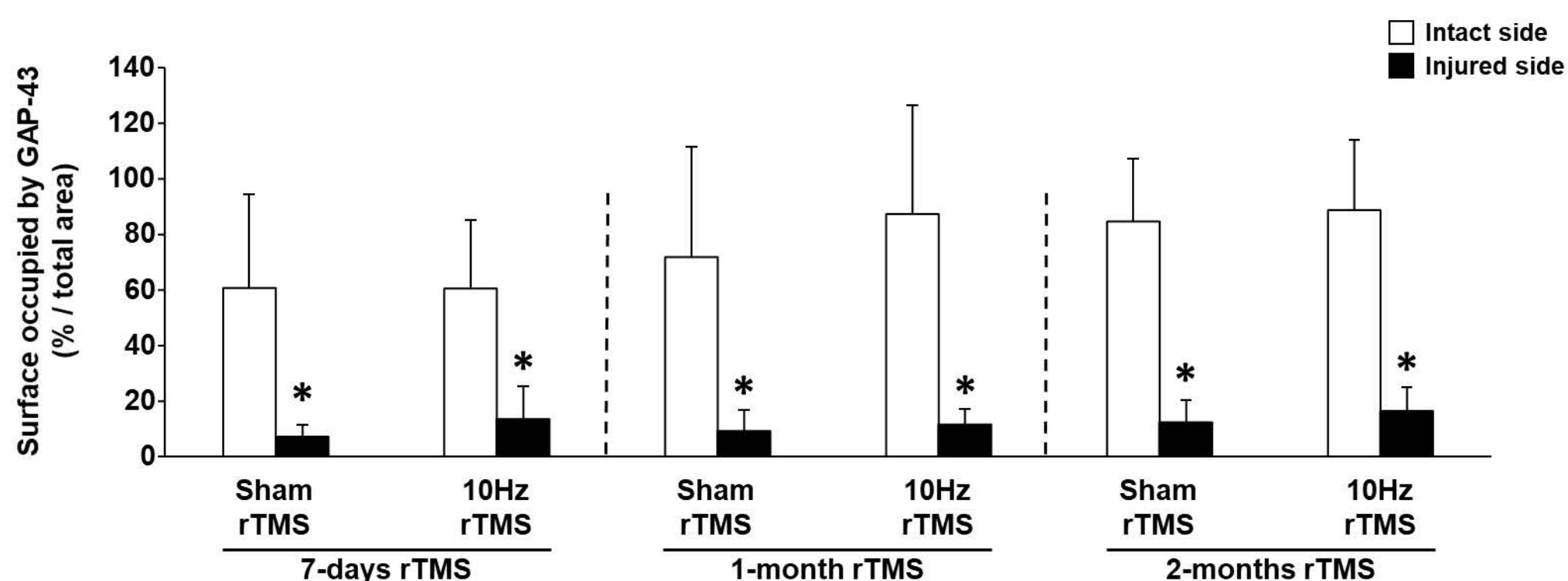
D.

Figure S2: GAP-43 expression in C3-C6 ventrolateral funiculi following C2 hemisection

A. Representative image showing location of phrenic motoneurons in red and the location of the ventrolateral funiculi (white dashed line). **B.** Schematic representation of a transversal section of the spinal cord showing the ventrolateral funiculi (black dashed line). **C.** Representative images showing expression of GAP-43 expression in C3-C6 ventrolateral funiculi in C2 hemisected rats, following 7-days, 1-month or 2-months Sham or 10Hz rTMS treatment. **D.** Quantitative analysis of the GAP-43 immunolabeled area in the ventrolateral funiculi for intact and injured sides of Sham or 10Hz rTMS treated C2 hemisected animals following 7-days, 1-month or 2 months treatment. There is no difference between intact side groups, and between injured groups (T-test, $p > 0.05$). * compared to intact side, $p < 0.01$.

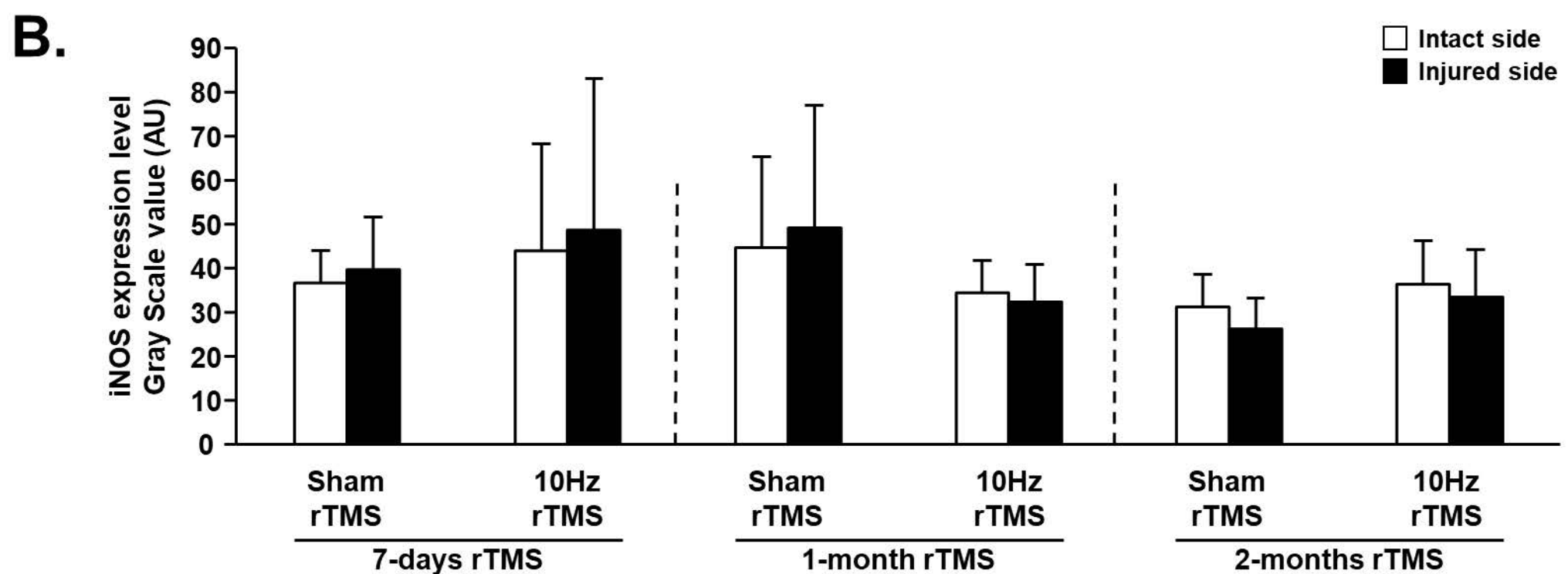
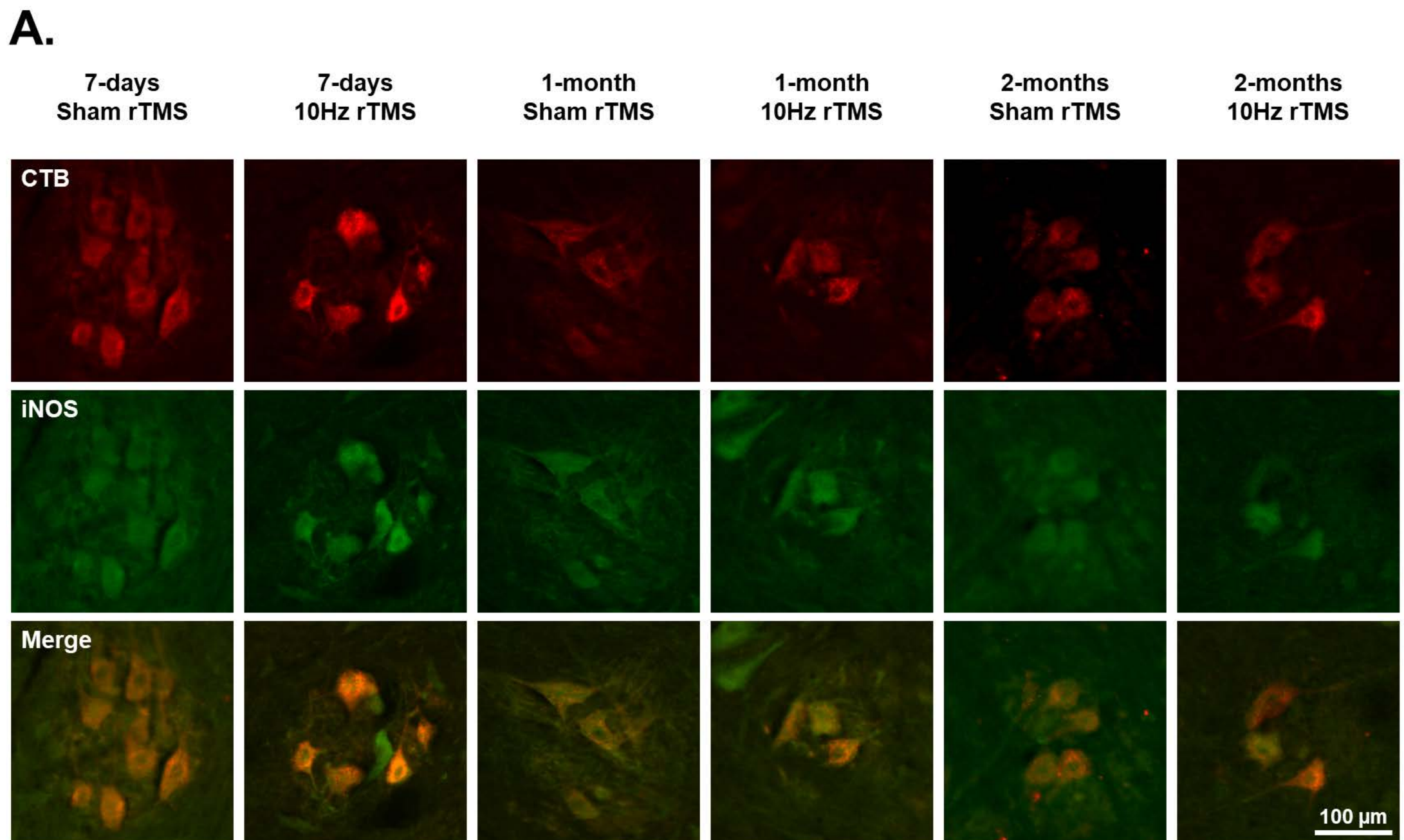


Figure S3: iNOS expression in phrenic motoneurons following C2 hemisection

A. Representative images showing expression of iNOS in intact side phrenic motoneurons labeled with CTB in C2 hemisected rats, following 7-days, 1-month or 2-months Sham or 10Hz rTMS treatment. **B.** Quantification of iNOS expression in phrenic motoneurons for intact and injured sides of Sham or 10Hz rTMS treated C2 hemisected animals following 7-days, 1-month or 2 months treatment. There is no difference between the intact and the injured sides for the different groups (Paired t-test for intact vs injured side, $p > 0.05$). There is no difference between intact side groups, and between injured groups (T-test, $p > 0.05$).

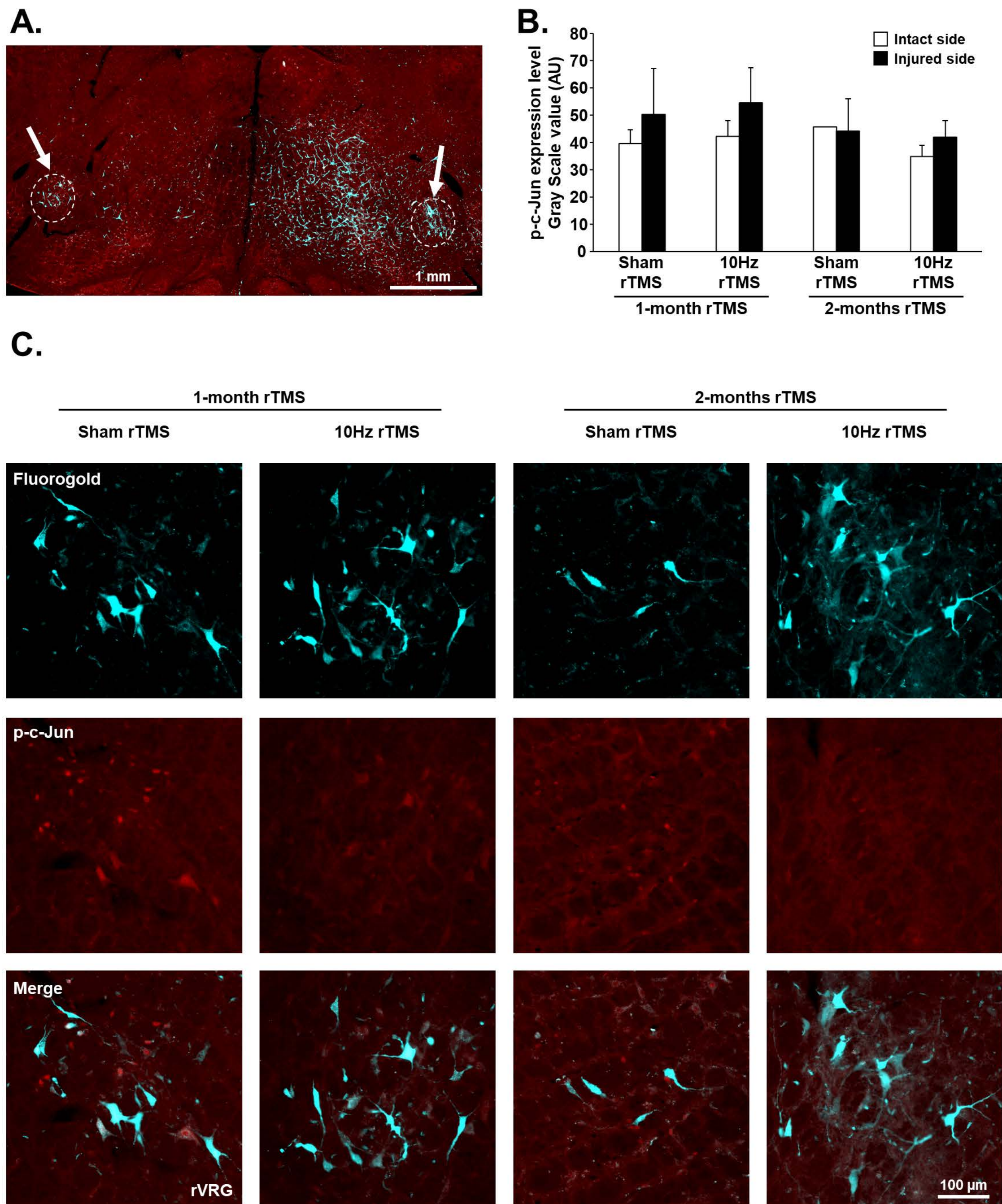


Figure S4: p-c-Jun expression in injured rVRG neurons.

A. Representative images showing rVRG in the brainstem. rVRG neurons are labeled with Fluorogold. **B.** Quantification of p-c-Jun expression in injured rVRG neurons following 1-month and 2-months 10Hz rTMS or Sham rTMS. **C.** representative images of p-c-Jun expression in injured rVRG neurons following 1-month and 2-months 10Hz rTMS or Sham rTMS. There is no difference between the different groups (t-test when possible, $p > 0.05$).

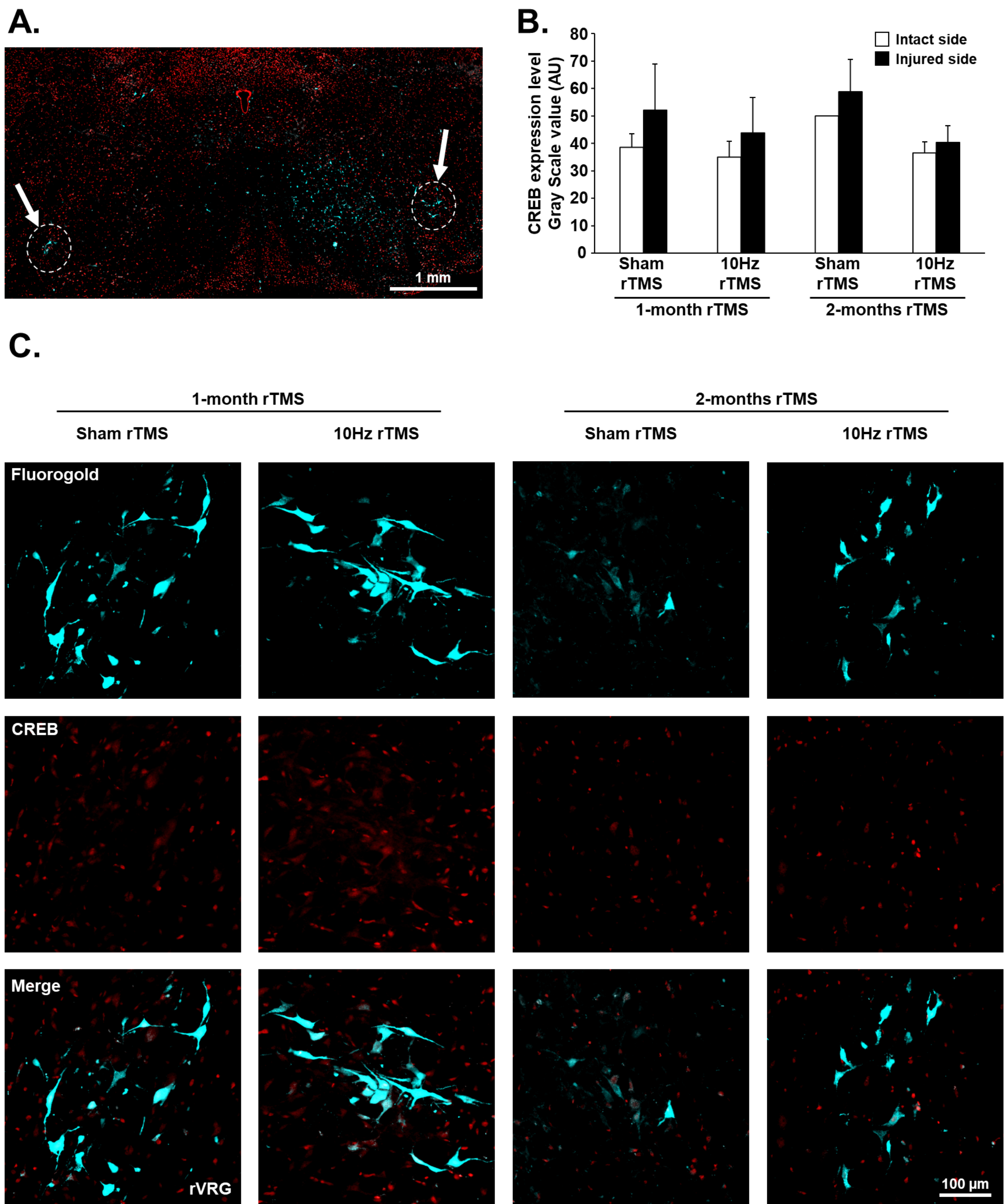


Figure S5: CREB expression in injured rVRG neurons.

A. Representative images showing rVRG in the brainstem. rVRG neurons are labeled with Fluorogold. **B.** Quantification of CREB expression in injured rVRG neurons following 1-month and 2-months 10Hz rTMS or Sham rTMS. **C.** representative images of CREB expression in injured rVRG neurons following 1-month and 2-months 10Hz rTMS or Sham rTMS. There is no difference between the different groups (t-test when possible, $p > 0.05$).

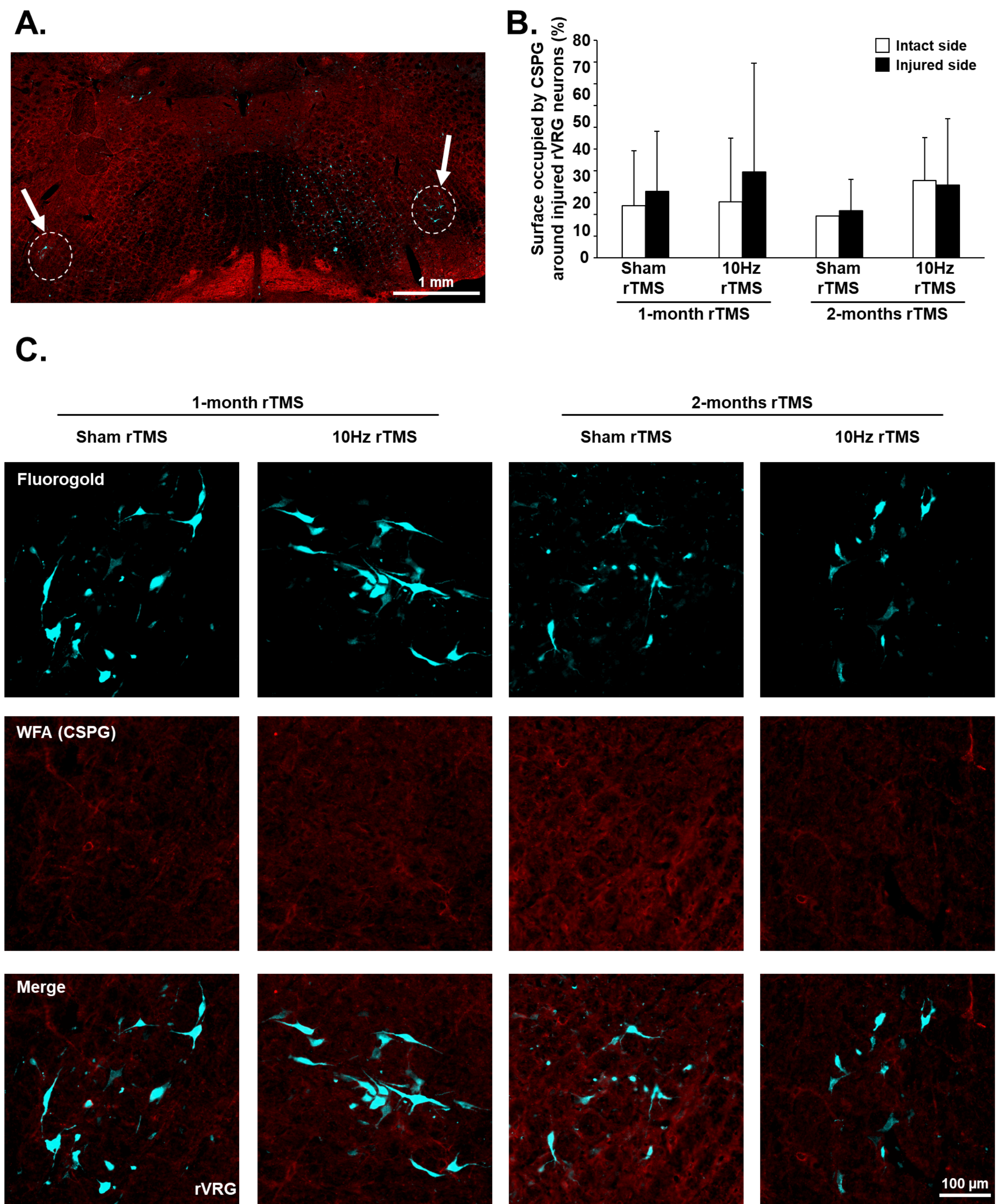


Figure S6: CSPG expression in in the area around injured rVRG neurons.

A. Representative images showing rVRG in the brainstem. rVRG neurons are labeled with Fluorogold. **B.** Quantification of CSPG expression in the area around injured rVRG neurons following 1-month and 2-months 10Hz rTMS or Sham rTMS. **C.** representative images of CSPG expression in the area around inured rVRG neurons following 1-month and 2-months 10Hz rTMS or Sham rTMS. There is no difference between the different groups (t-test when possible, $p > 0.05$).

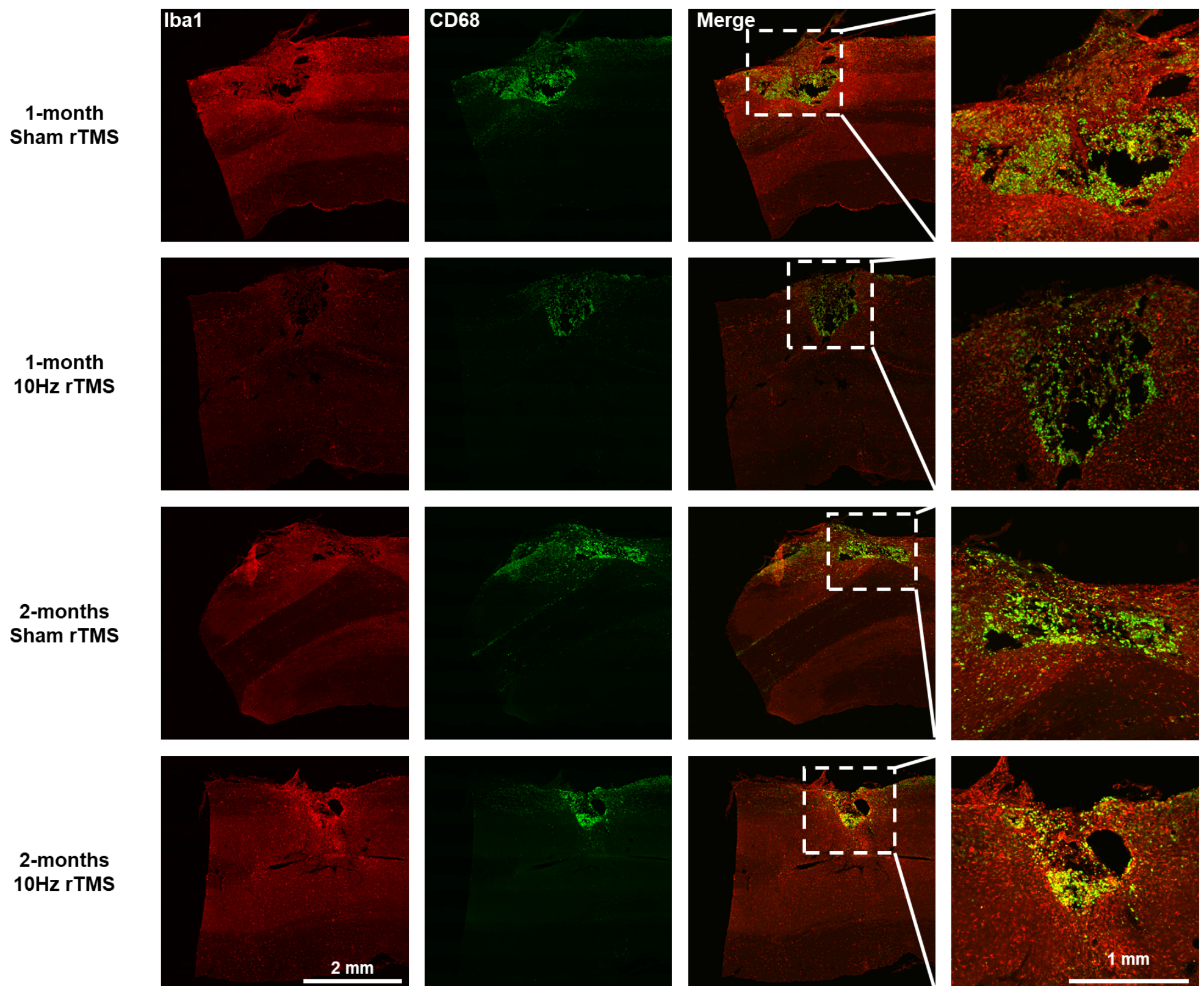
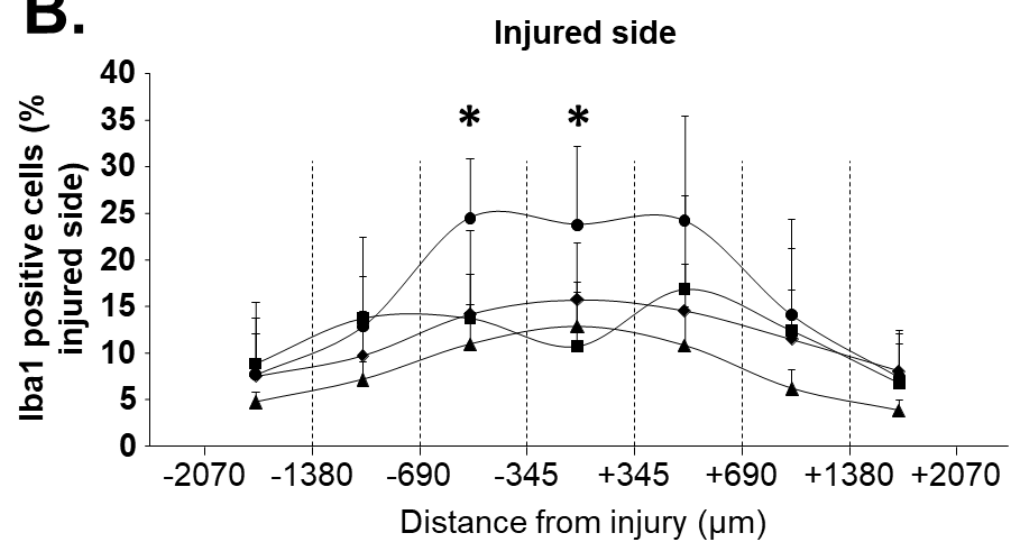
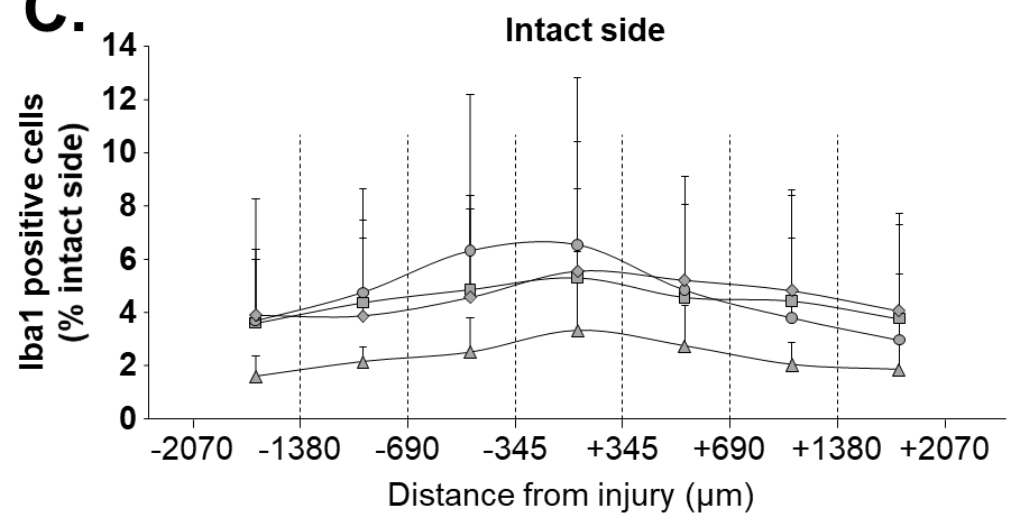
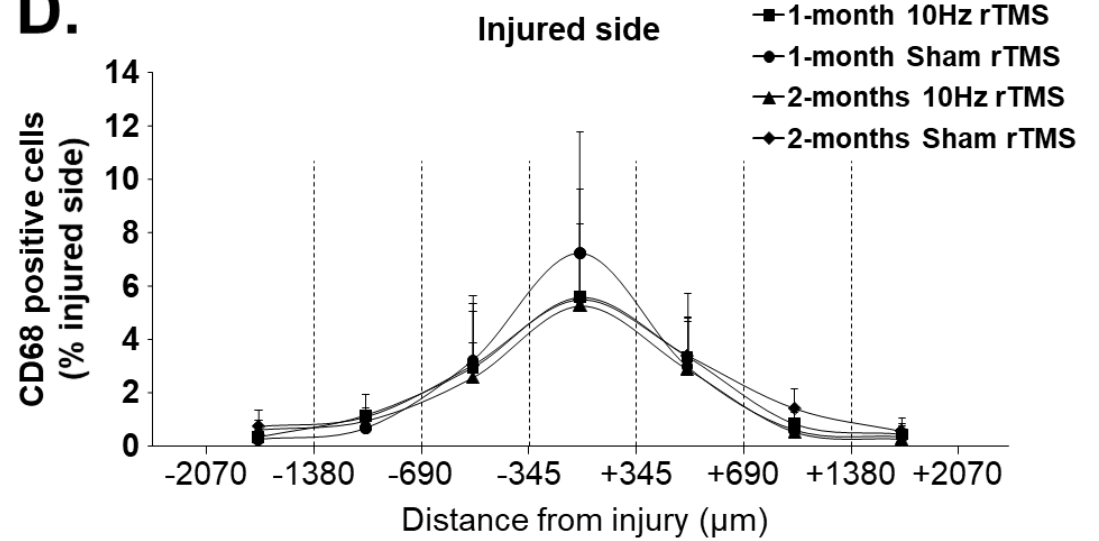
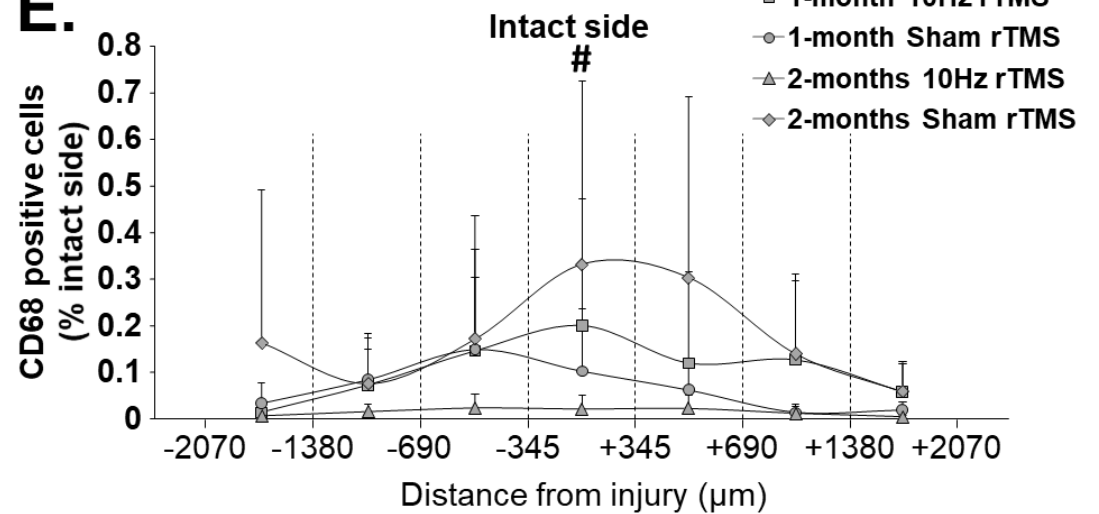
A.**B.****C.****D.****E.**

Figure S7 : Iba1 and CD68 expression in the C1-C3 spinal cord following C2 hemisection

A. Representative images showing expression of Iba1 and CD68 at the site of the lesion in C2 hemisected rats, following 1-month or 2-months Sham or 10Hz rTMS treatment. Quantification of Iba1 expression intact side (**B**) or injured side (**C**) of Sham or 10Hz rTMS treated C2 hemisected animals following 1-month or 2 months treatment. Quantification of CD68 expression intact side (**D**) or injured side (**E**) of Sham or 10Hz rTMS treated C2 hemisected animals following 1-month or 2-months treatment. * 1-month 10 Hz rTMS vs 1-month Sham Hz rTMS, Two-way-ANOVA, $p < 0.05$. # 2-months 10 Hz rTMS vs 2-months Sham Hz rTMS, Two-way-ANOVA, $p < 0.05$.

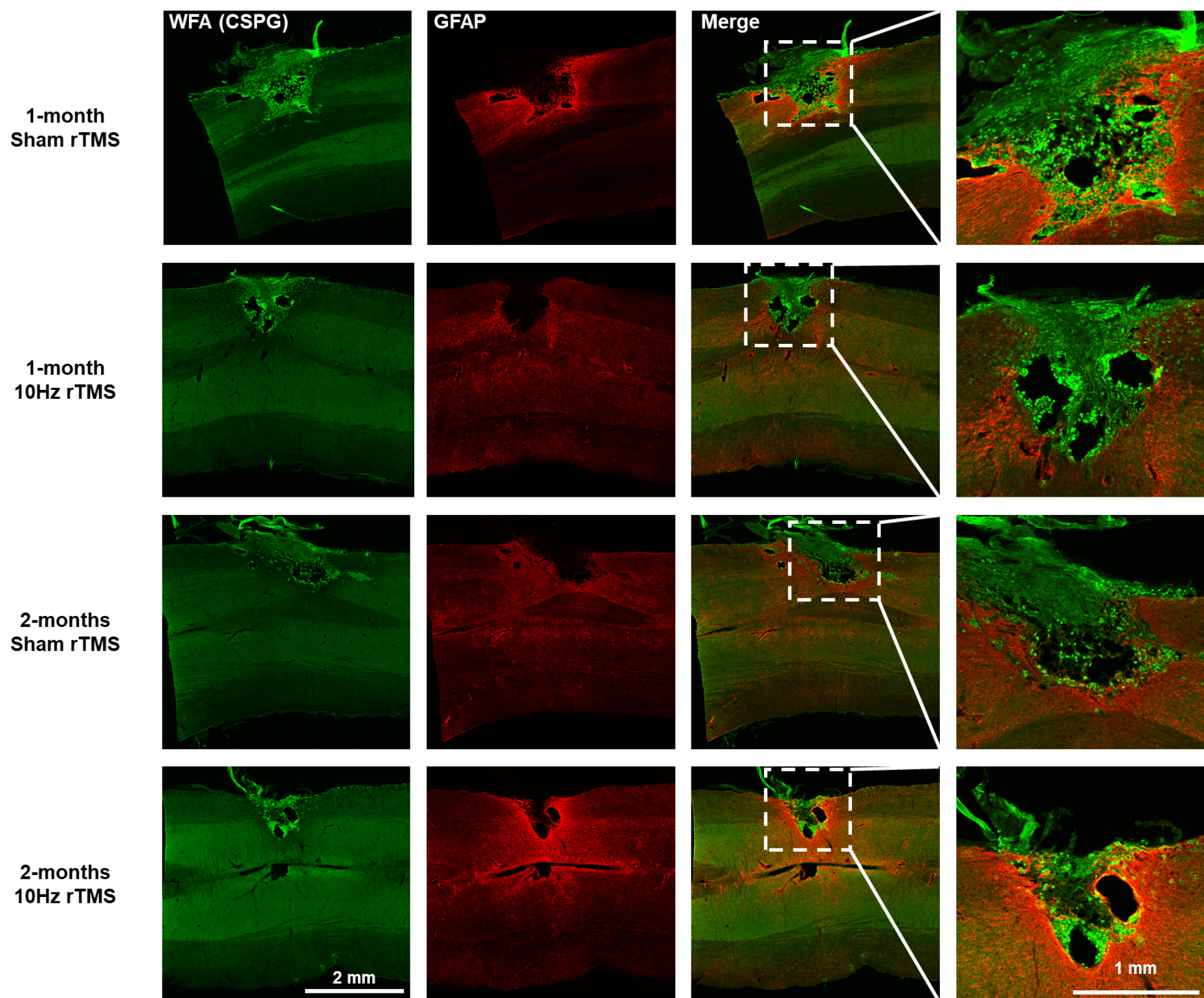
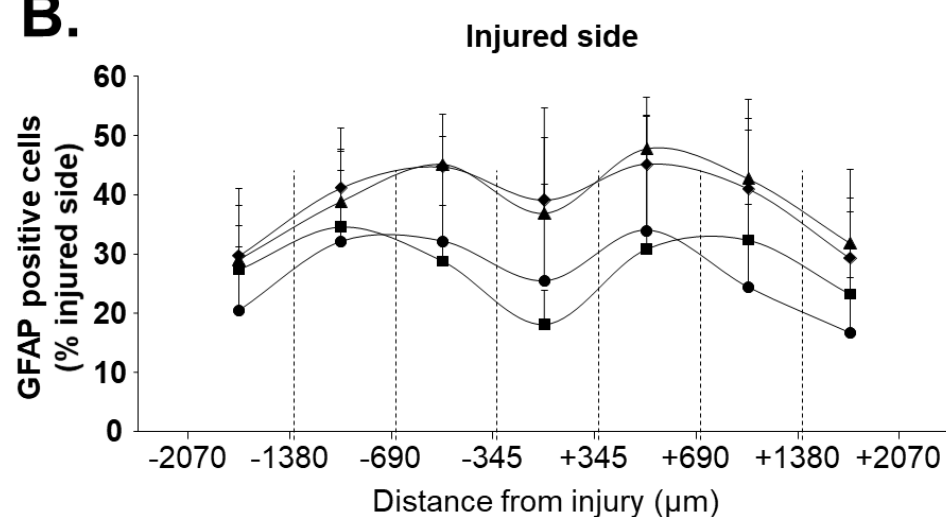
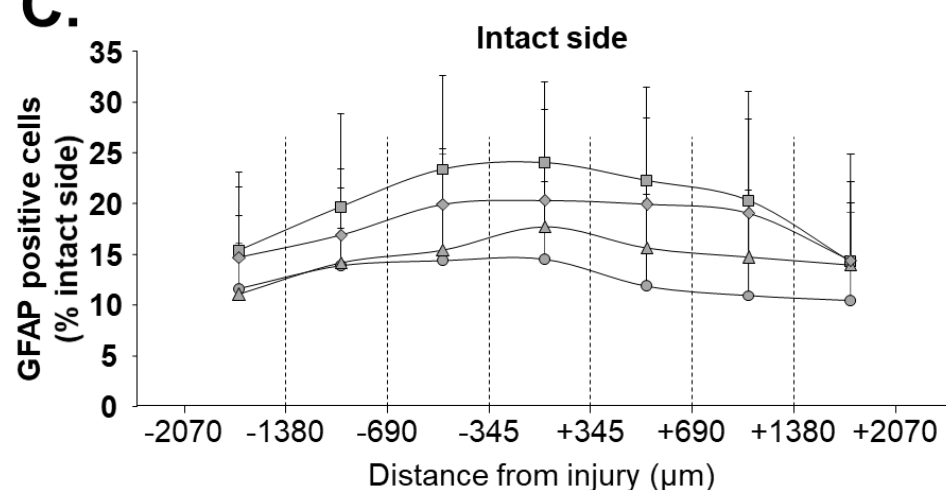
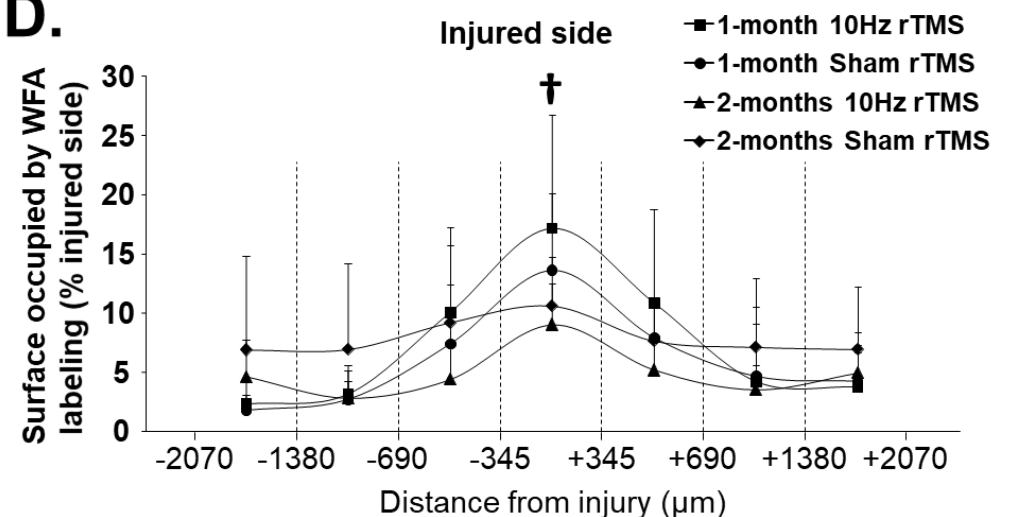
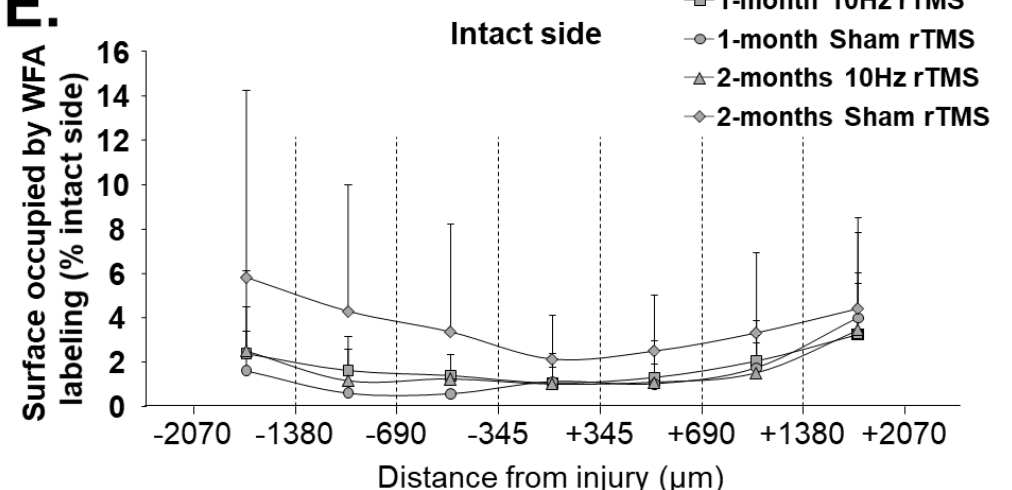
A.**B.****C.****D.****E.**

Figure S8 : GFAP and WFA expression in the C1-C3 spinal cord following C2 hemisection

A. Representative images showing expression of GFAP and WFA (CSPG) at the site of the lesion in C2 hemisected rats, following 1-month or 2-months Sham or 10Hz rTMS treatment. Quantification of Iba1 expression intact side (**B**) or injured side (**C**) of Sham or 10Hz rTMS treated C2 hemisected animals following 1-month or 2-months treatment. Quantification of CD68 expression intact side (**D**) or injured side (**E**) of Sham or 10Hz rTMS treated C2 hemisected animals following 1-month or 2-months treatment. † 1-month 10 Hz rTMS vs 2-months 10 Hz rTMS, Two-way-ANOVA, $p < 0.05$.