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Introduction and Aims

High intensity interval training (HIIT) is defined as brief intense bouts ($\geq 85\%$ VO₂peak) intercalated with brief rest periods¹. HIIT has been proven to be safe, feasible, and especially effective method to improve physical fitness, in various chronic diseases². There is an increasing body of evidence underpinning high-intensity exercise as an effective and time-efficient intervention for improving physical function in cancer survivors³, however, the effects of HIIT on the colon tumor model are poorly understood.

Objective

We aimed to analyze the kinetics growth and histological characteristics of syngeneic colon MC-38 cells in mice exposed to an interval exercise training (HIIT) model.

Methodology

38 animals (C57/BL6) were randomized into 4 groups (n = 9 ± 1; figure 1): G. Con, G. Tumor, G.EX, G.EX + Tumor. G. Tumor and G.EX + Tumor groups were inoculated with viable MC-38 cells (5x10⁵ / ml) in a single subcutaneous dose at the fourth training week. CEUA/INCA 002/2018

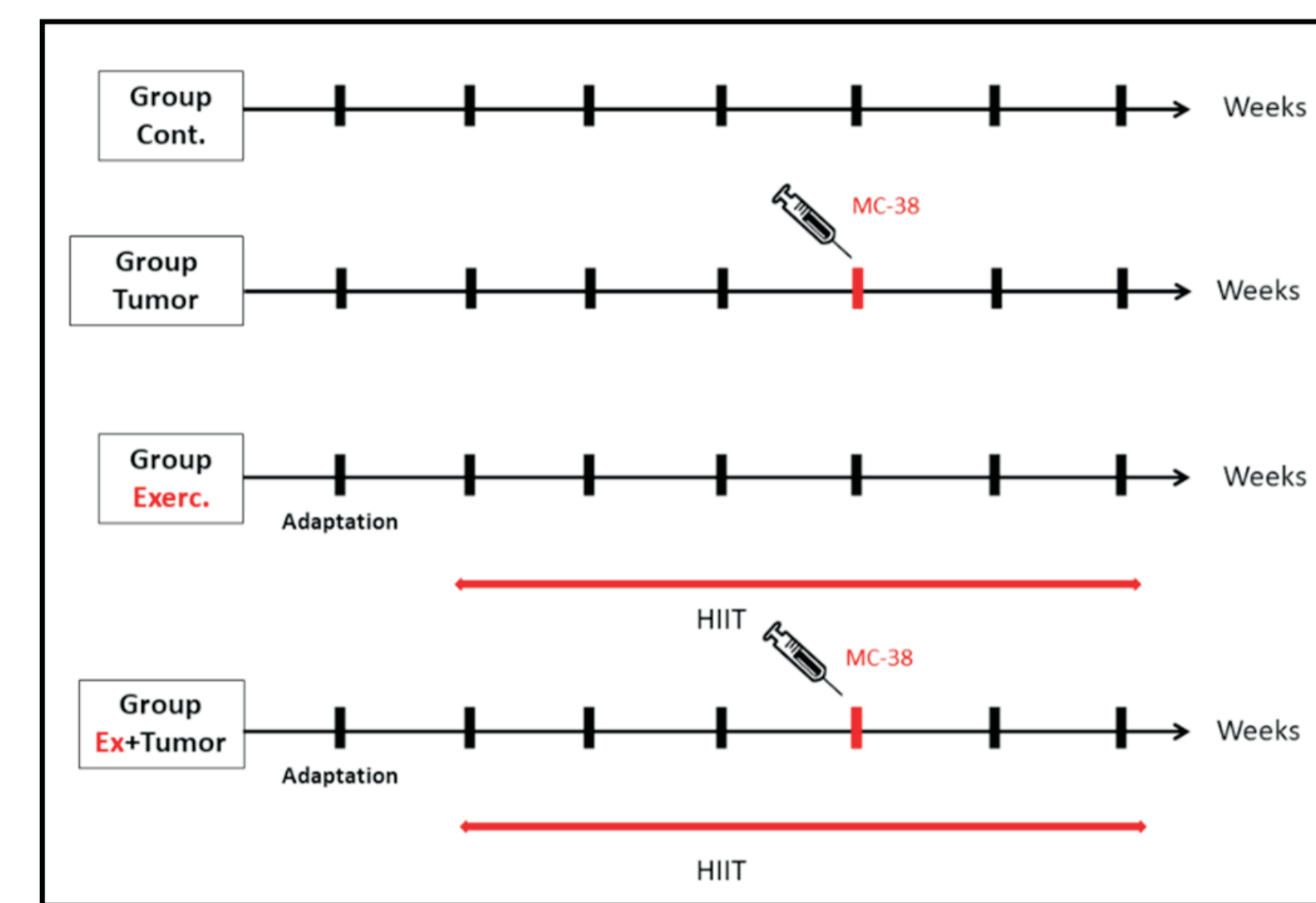


Figure 1. Experimental design: G Control (n = 8): No exercise or MC-38; G Tumor: group was inoculated with MC-38 cells (5x10⁵ / ml, n= 10); G.EX (n = 10): group submitted only to the HIIT protocol; G.EX + Tumor (n = 10): HIIT group inoculated with MC-38; Progressive load (10% of animal body weight) added each week;

Results

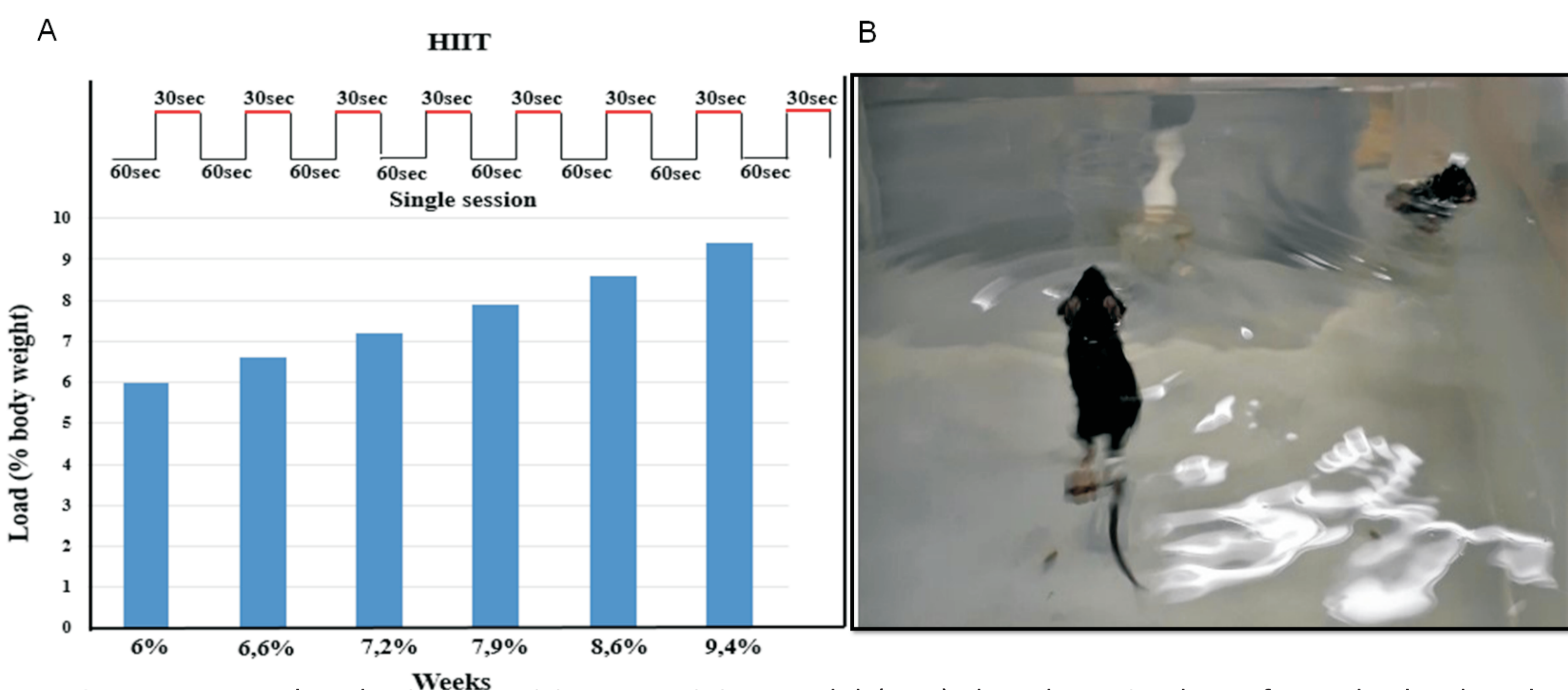


Figure 2. HIIT protocol and mice exercising. A Training model (HIIT) that the animals performed; Blue bar: load progression in weeks, 6%, 6,6%, 7,2%, 7,9%, 8,6%, 9,4%; HIIT session, 8 x 30sec of exercise for 60sec of passive recovery. B. Mice swimming with load attached to tail.

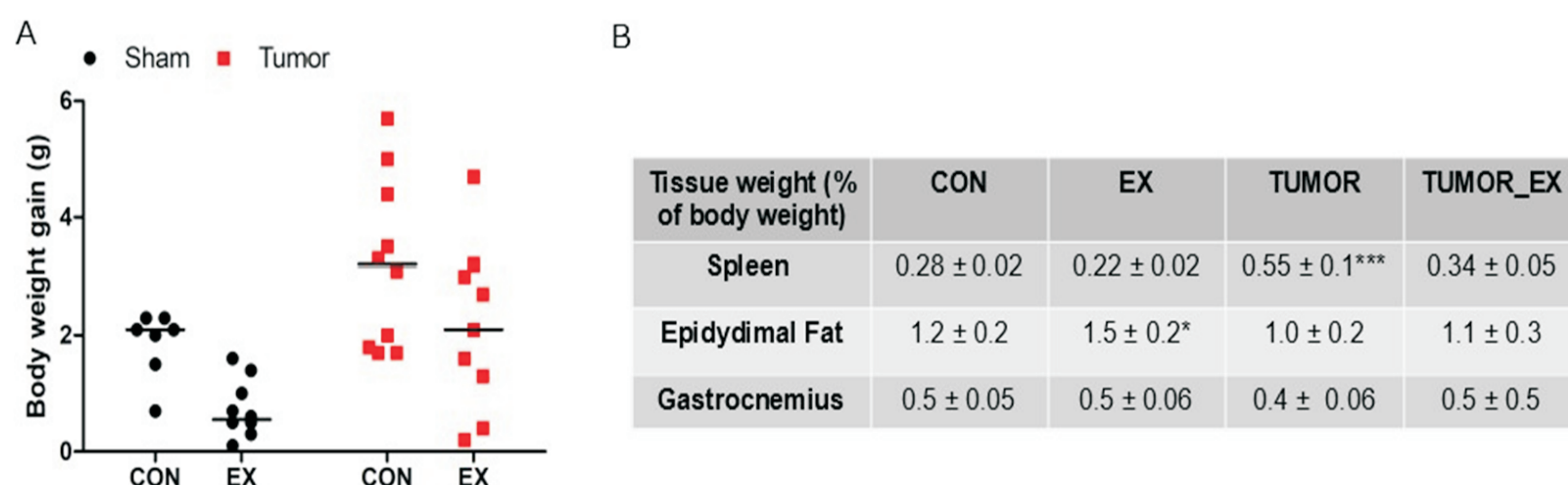


Figure 3. Exercise reduces body weight gain and counteracted splenomegaly after tumor inoculation. A Body weight gain among groups. B. Matrix of comparison among tissue weight adjusted as final body weight. Data are means ±SD. Two-way ANOVA, Significant differences *** p<0.001 versus CON, EX and TUMOR_EX groups

Conclusion

These data suggest that a HIIT protocol delayed tumor onset, reduced tumor growth and decreased splenomegaly, matching with a less tumorigenic and immunosuppressive environment. Combined, an intense and time-effective exercise protocol exerts anti-tumorigenic effect and may be considered in the exercise repertory in the near oncology studies.

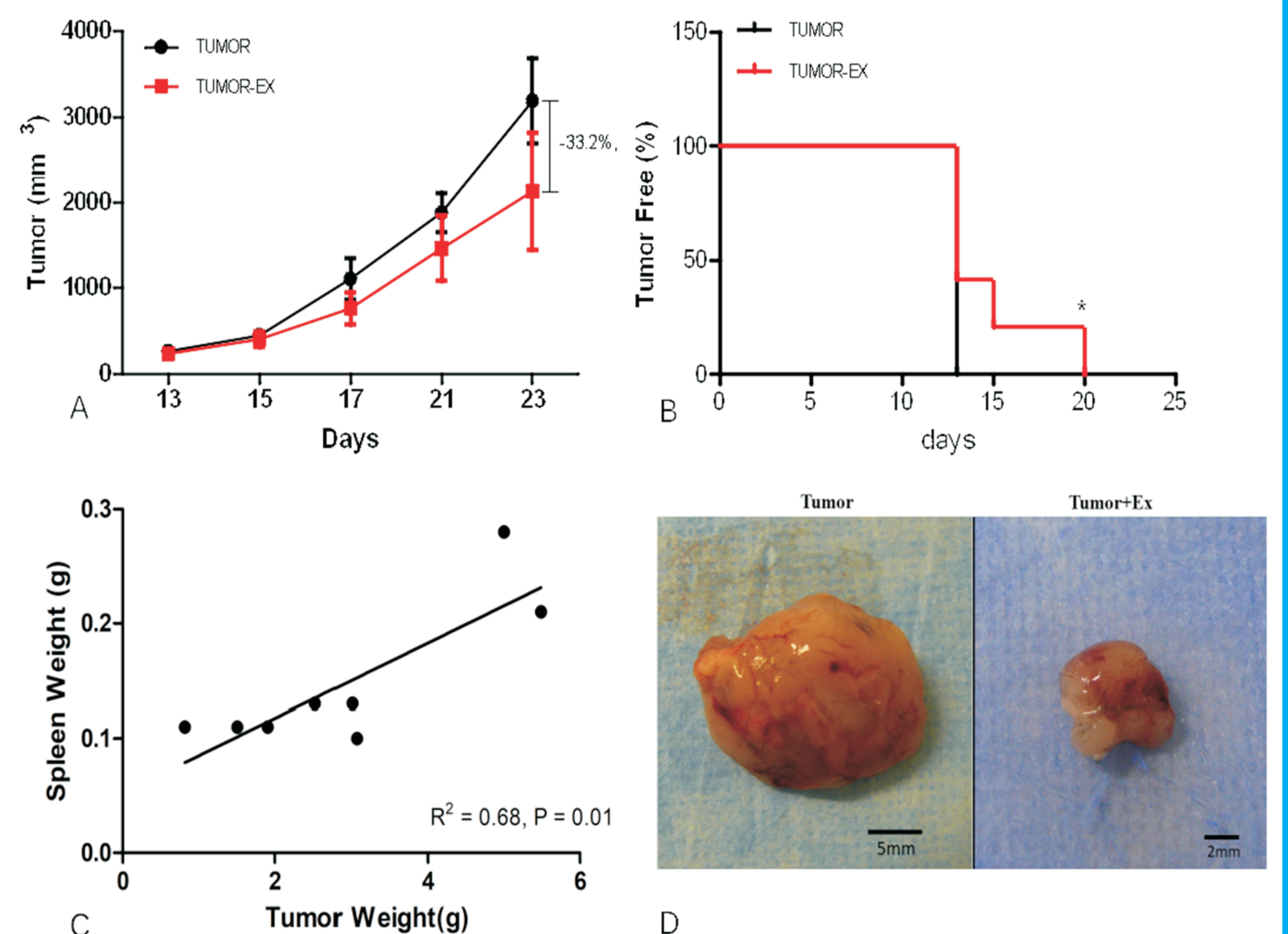


Figure 4. Exercise reduced tumor onset and tumor growth. A) Tumor growth curve expressed in days after inoculation (Two-way ANOVA); B) Tumor onset rate (Log-rank test); C) Correlation between spleen weight and tumor weight (Pearson test). D) Tumors Picture following euthanized. Log Rank analysis. * p < 0.05.

References

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