

Zebrafish: an appropriate animal model to study inflammatory bowel disease.

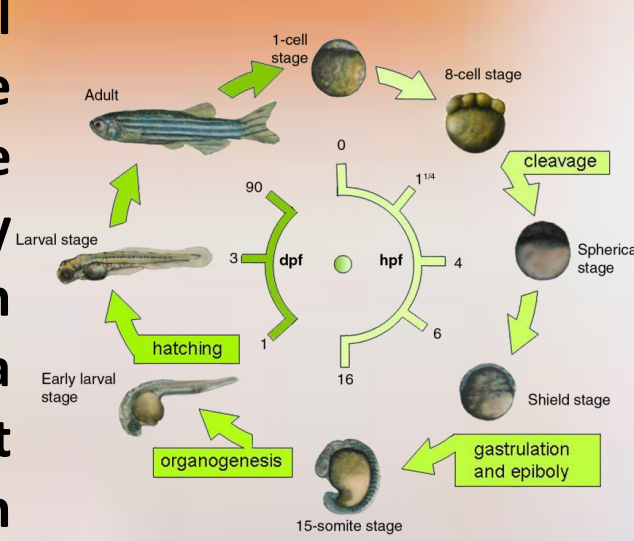
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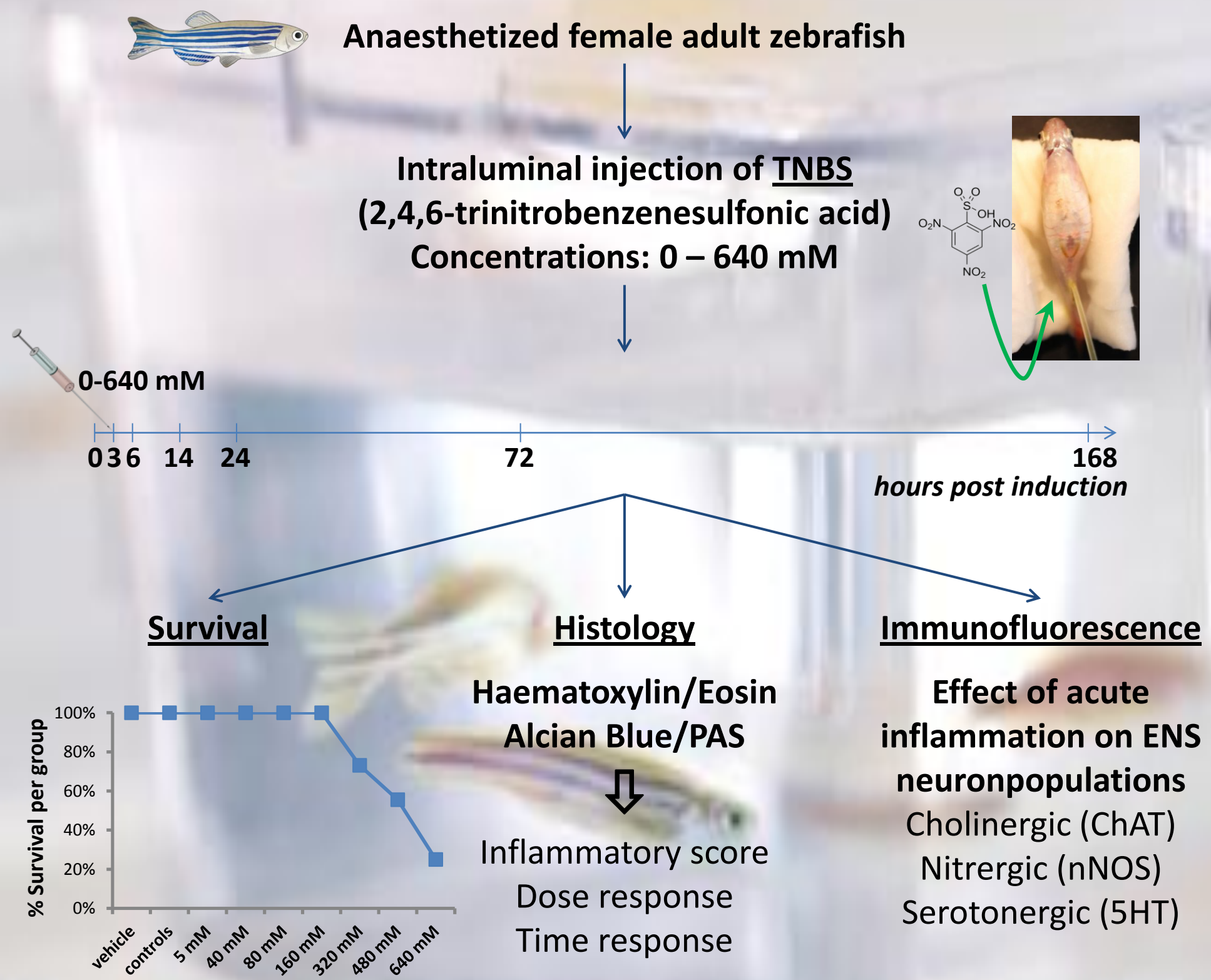
Introduction

Inflammatory bowel disease (IBD) is a gastrointestinal disease with a high impact on modern society. At present, therapeutic management of IBD is problematic because of the incomplete understanding of disease pathogenesis. Development of new drugs in IBD requires experiments in animal models.

The zebrafish (*Danio rerio*) has emerged as a powerful model organism of human diseases, mainly due to the high genetic and organ homology to humans. Some studies on chemically-induced colitis were already performed on zebrafish larvae using immersion exposure. The purpose of this study was to establish a protocol for chemically-induced colitis in adult zebrafish mimicking the acute phase of inflammation in IBD.



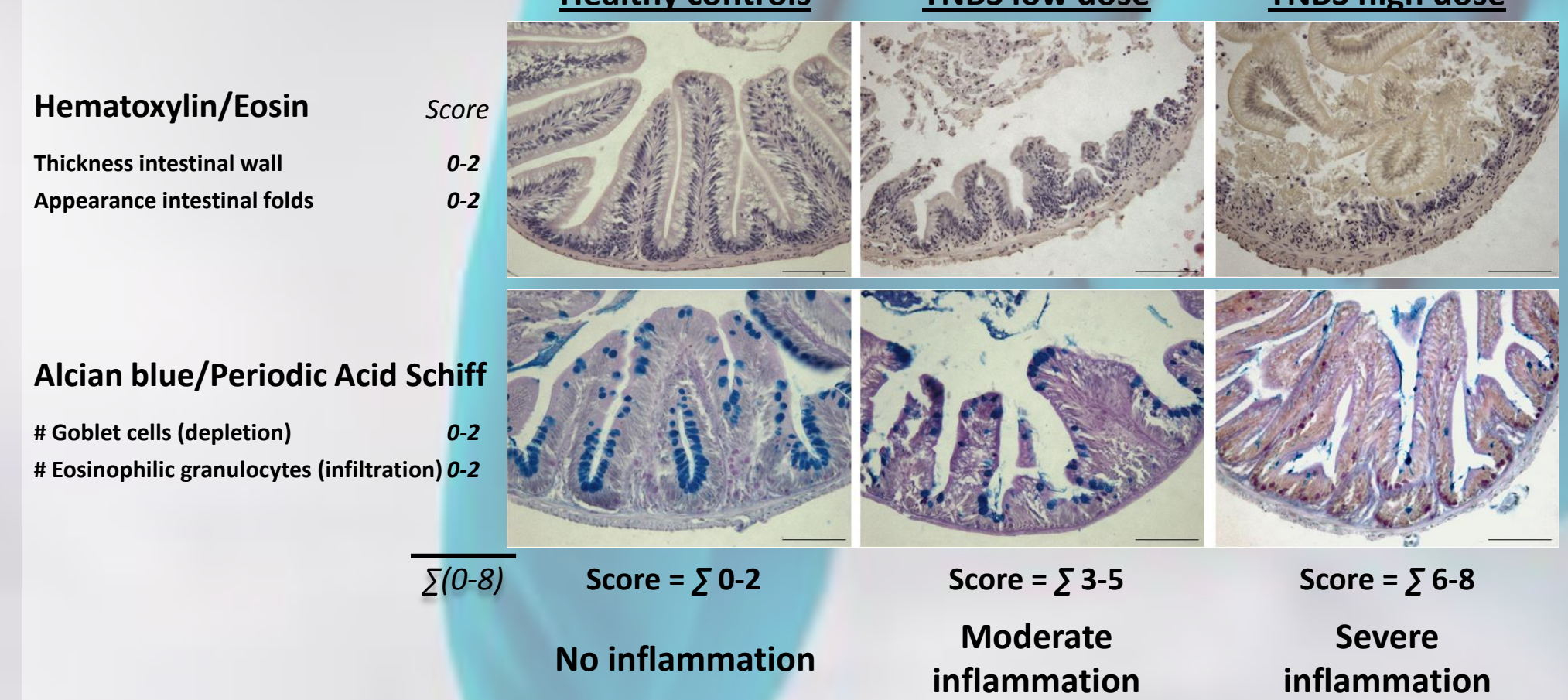
Material and methods



Results

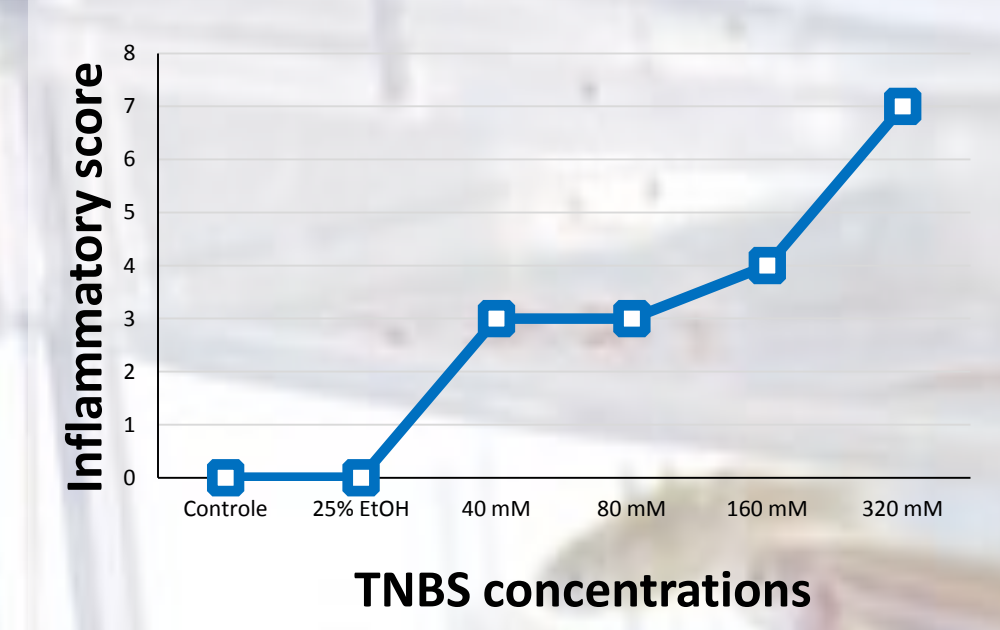
Histology

Inflammatory score



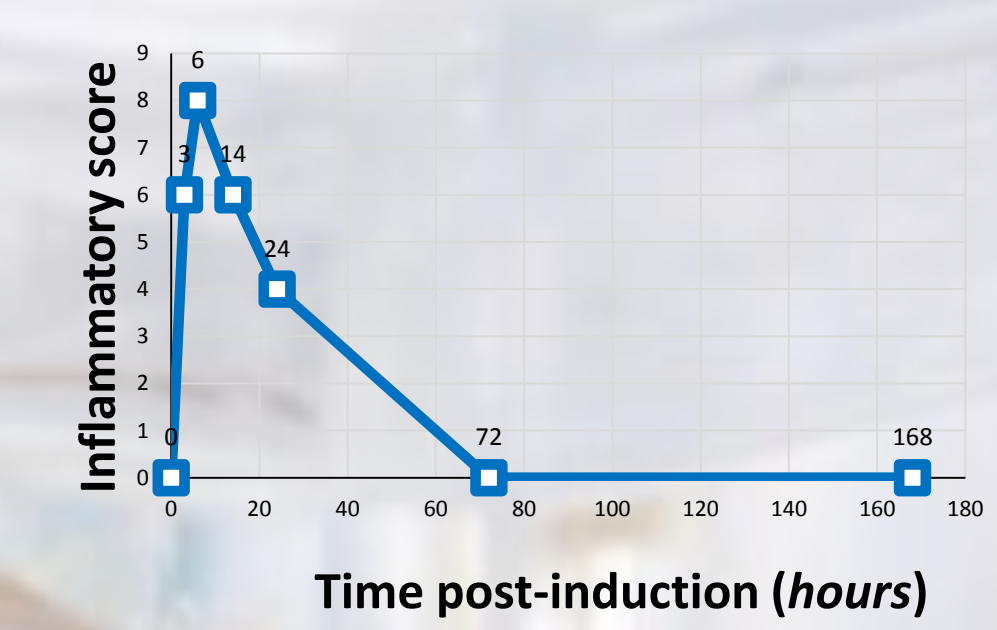
Dose response

The highest score was obtained using 320 mM TNBS solved in 25% ethanol.



Time response

Using the optimal dosis of TNBS, the inflammation peaked after 6 hours.



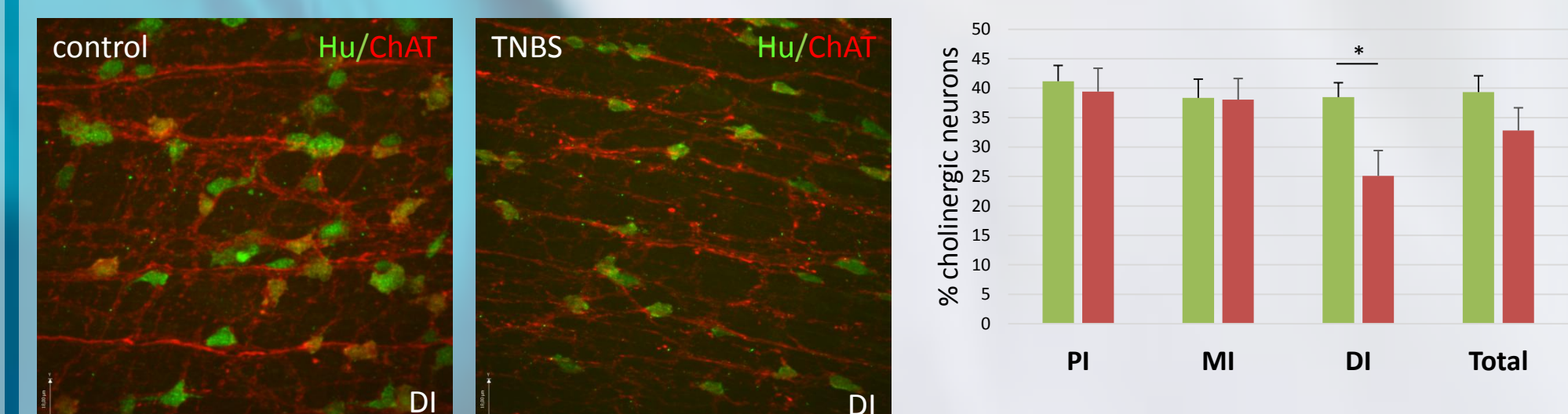
Conclusion

This study described a method of chemically-induced colitis in the distal intestine of the adult zebrafish. At the acute phase, inflammation was accompanied by an imbalance in neuronal content comparable to neuronal changes observed in humans and other animal models. It is concluded that the zebrafish is a valuable animal model to study IBD.

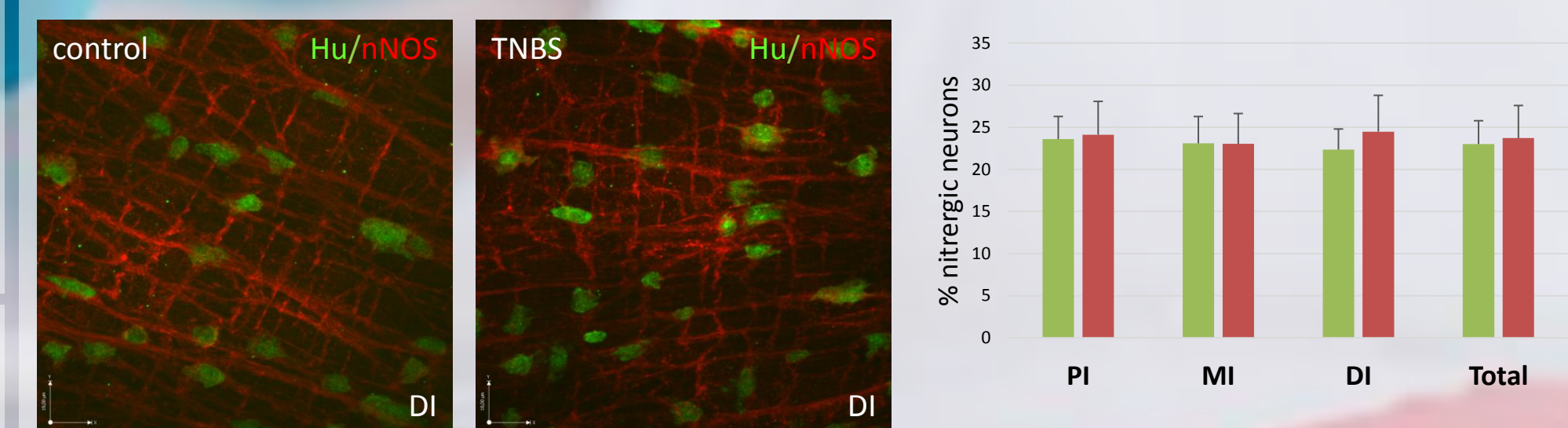
Abbreviations: 5HT: serotonin; ChAT: choline acetyl transferase; DI: distal intestine; ENS: enteric nervous system; EtOH: ethanol; IBD: inflammatory bowel disease; MI: mid-intestine; mM: millimolar; PI: proximal intestine; TNBS: 2,4,6-trinitrobenzenesulfonic acid. Bars = 500

Immunofluorescence

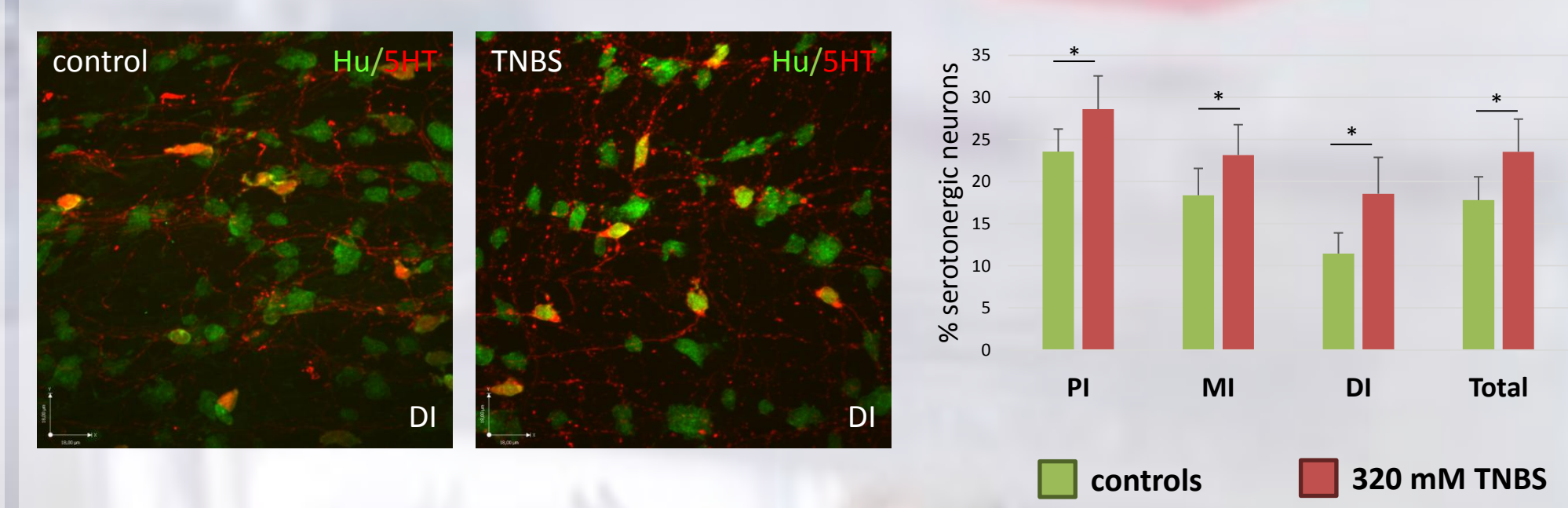
The proportion of cholinergic neurons was reduced in the distal intestine



The proportion of nitroergic neurons did not change during inflammation



The proportion of serotonergic neurons increased over the entire intestine



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