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Increasing the Colonisation and Proliferation of Blue Catfish (Ictalurus Furcatus) Donor Stem Cells to Produce Xenogeneic Catfish: Determining the Triploid Channel Catfish's Ideal Host Age (I. Punctatus)

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Abstract

For the creation of hybrid catfish (channel catfish, Ictalurus punctatus, and blue catfish, I. furcatus) embryos, xenogenesis is a cutting-edge method. Undifferentiated diploid germline stem cells from donor fish can be used to perform the xenogeneic procedure by transplanting them into sterile recipients. With this technique, receivers can develop gametes originating from donors. Prior to recently, there was little understanding of the ideal age to inject cells into hosts when donor cells were transplanted.

Keywords: Xenogenic catfish; Blue catfish; Stem cells

Introduction

Due to several superior traits, including a fast and uniform growth rate, efficient food conversion, tolerance to low dissolved oxygen, improved disease resistance, higher survival, dress out percentage, fillet yield, and seining, and the catfish industry in the United States has steadily shifted towards the production of hybrid catfish over the past ten years [1,2].

Methods

Applications for xenogenesis have been successfully carried out using both SSCs and OSCs. They may pass on genes to succeeding generations and have the potential to regenerate them continuously. Also, it is simpler to harvest vast amounts of these particular donor cells. SSC transplantation has been successful in a number of commercially valuable species, including masu salmon SSCs into rainbow trout, jundia catfish, Rhamdia quelen SSCs into Nile tilapia, Oreochromis niloticus, GFP transgenic rainbow trout SSCs into wild-type rainbow trout [3, 4].

Salvelinus leucomaenis SSCs into wild-type trout; Nibea mitsukurii SSCs into chub mackerel; Nibea mitsukurii SSCs into Japanese char; and blue catfish SSCs into triploid channel catfish Moreover, OSCs have been explored as xenogenic donor cells. Examples include injecting transgenic zebrafish with Danio rerio OSCs into zebrafish, transgenic rainbow trout with GFP OSCs into wild-type trout, and critically endangered Chinese sturgeon with Acispenser sinensis OSCs into wild sturgeon, A. dabryanus [5, 6, and 7].

Discussion

The majority of xenogenic transplant experiments were carried out with little understanding of the ideal host age that produces the highest success rates. Based on growth performance, survival, proliferation, and colonisation, the current study determined that 4 to 6 DPH was the ideal age to transplant donor-derived stem cells into a recipient sterile channel catfish, filling a knowledge gap [8, 9].

Conclusion

Day of stem cell injection (0 to 18 DPH) had no impact ($P \geq 0.702$) on mean (± SD) TL (Fig. 2A) and BW (Fig. 2B) of recipient fish when evaluated at the 1st (5.0 cm ± 0.2 and 2.5 g ± 0.1, respectively) and 2nd time intervals (14.7 cm ± 0.7 and 15.1 g ± 0.7, respectively). Segmented linear regression showed a significant increase in survival of recipient fish at 1st time interval when injected with blue catfish stem cells from 0 to 5.4 DPH [10].

Acknowledgement

None.

Conflict of Interest

None.

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