Beginning Life Uncovered: Chemical Dechorionation of Freshwater Fish Embryos

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Experimentation with chemical dechorionation, removal of the egg envelope surrounding embryos, was conducted after experiencing low hatching rates in thermal shock induced polyploid and hybrid embryos during previous experimentation. Previous experiments were conducted for the purpose of facilitating hatching of these frequently inferior embryos. Earlier studies with teleost fish provided evidence that embryos can be released chemically by treatment with proteolytic enzymes but effects on viability and growth following treatment was not examined.

Two experiments were conducted, the first using koi carp and the second using common carp. Sequential exposure of replicated groups of fish embryos to urea-saline solution and trypsin-urea solution was used to achieve chemical dechorionation. Durations of 1, 2, 4, and 8 minutes in trypsin-urea solution were tested to determine the appropriate duration for successful dechorionation. Groups were also exposed to cold shock (1.5 ^{o}C) 28 minutes post fertilization after urea-saline treatment but before trypsin-urea treatment. In both experiments, untreated control groups were included in parallel to experimental treatment groups.

In both experiments, samples of approximately 1g of carp eggs, were inseminated with 80uL of prediluted (10 fold) carp sperm in a volume of 1 ml. Survival of treatment groups was monitored throughout the embryonic development and larvae/juveniles were raised for 60 days. Our results indicate that carp embryos were released from the chorion ~18h post fertilization (27^{o}C), about 24-30 hours prior to hatching in control groups. Survival of dechorionated embryos was not different than of control embryos (85-95%) and no differences were observed in growth of fish.

Implications of successful removal of the egg envelope of teleost fish embryos include: increasing hatching success of inferior embryos, facilitating studies on cryoprotectant penetration, improving accuracy and uniformity of embryo toxicity tests and allowing for direct blastomere transplantation procedures to other targeted (intra- or inter species) embryos (chimeras).