

Publication

Antisense Oligonucleotide-Mediated Transcript Knockdown in Zebrafish

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Antisense oligonucleotides (ASOs) are synthetic, single-strand RNA-DNA hybrids that induce catalytic degradation of complementary cellular RNAs via RNase H. ASOs are widely used as gene knockdown reagents in tissue culture and in *Xenopus* and mouse model systems. To test their effectiveness in zebrafish, we targeted 20 developmental genes and compared the morphological changes with mutant and morpholino (MO)-induced phenotypes. ASO-mediated transcript knockdown reproduced the published loss-of-function phenotypes for *oep*, *chordin*, *dnd*, *ctnnb2*, *bmp7a*, *alk8*, *smad2* and *smad5* in a dosage-sensitive manner. ASOs knocked down both maternal and zygotic transcripts, as well as the long noncoding RNA (lncRNA) MALAT1. ASOs were only effective within a narrow concentration range and were toxic at higher concentrations. Despite this drawback, quantitation of knockdown efficiency and the ability to degrade lncRNAs make ASOs a useful knockdown reagent in zebrafish.

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