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Determination of Expression Levels of all 20 DNA Polymerases in Zebrafish (Danio rerio) thoughout Development and following Treatment with MNU, Doxorubicin, and UV Radiation (abstract)

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extant 3-keto steroid receptors. nGRE binding and repression originated as a subfunction of the ancestral 3-keto steroid receptor coincident with (+)GRE binding, and this subfunction was optimized in the evolutionary lineage of the glucocorticoid receptor but lost in the ancestors of the mineralocorticoid, progesterone, and androgen receptors. Further, using x-ray crystallography and other structural biology approaches, we define the structural mechanisms by which the modern-day DNA binding specificity evolved in the glucocorticoid receptor.

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Determination of Expression Levels of all 20 DNA Polymerases in Zebrafish (Danio rerio) thoughout Development and following Treatment with MNU, Doxorubicin,and UV Radiation.

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Zebrafish like humans contain sixteen DNA polymerases encoded by 20 different genes, the most recent uncovered in 2012. The expression of the DNA polymerases were determined at stages of development throughout the zebrafish (Danio rerio) life establishing it as an excellent model for the study of basic biological processes including DNA replication. RNA isolated from zebrafish of varying ages from 2 hours to 3 years old was used for Reverse-Transcriptase PCR to determine the level of polymerase gene expression throughout zebrafish development. All the polymerases were expressed at every stage of development examined. Quantitative RT-PCR was used to determine the relative quantity of polymerase expression by comparison with actin. While polymerase replicative polymerases like polymerase delta1 and delta2 resulted in similar levels in all the developmental stages, polymerases iota and eta were detected at decreased levels, most possibly due to their specialized roles in DNA replication. The expression level of polymerases beta and eta was highest in older stages of zebrafish development. The polymerase expression levels were also examined following exposure of 1-day old zebrafish embryos to the doxorubicin and methylnitrosourea, or ultraviolet radiation. One of the primary results was an increase in the level of polymerase eta expression due to its role in thymine-thymine photoproduct bypass. This completed study of polymerase expression results in a comprehensive model of DNA replication in zebrafish that can be utilized in future research.