# Decoding differentially expressed genes in artificial light at night (ALAN) induced zebrafish ovary and development of a possible major lifestyle diseases gene signature

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A quickly growing threat to worldly biodiversity is light pollution [1]. The inappropriate exposure to lighting due to artificial light at night (ALAN) negatively influences the circadian system, inducing acute effects on sleep and cognition, as well as chronic endocrine-disrupting effects resulting in lifestyle diseases like obesity, cardiovascular disease, diabetes, and cancer [2]. The treatment with different lighting conditions can, at least in some cases, hold the circadian clock, and considerably reduce the sensitivity of rhythms towards certain drugs [3]. Despite the serious repercussions, the effect of ALAN at the transcriptomic level is yet to be studied deeply, especially because biological rhythms are also controlled transcriptionally. Here in this study, we have set up three experimental conditions, female zebrafish exposed to continuous light for one week, LLW, one month, LLM, and for one year, LLY, which revealed a clear desynchronization of circadian related genes as well as other genes in comparison to the normal 12-hour light and 12-hour dark, LD sample. The whole transcriptome combined data analysis of all four groups revealed 2309 genes important for healthy lifestyle are significantly up or down regulated. Further, a sample-to-sample comparison was also done to confirm the expression of genes in different levels of light entrapment. The development of several disease classes covering maximum available lifestyle disease types, and a novel gene signature with 28 unique genes (LDvsLLW: 14, LDvsLLM: 10, LDvsLLY: 12) reveals the effect of continuous light in zebrafish. We believe this result could help with the prognosis of disease classes including a wide array of neoplasms, urogenital diseases, pregnancy complications, mental disorders, endocrine system diseases, skin and connective tissue diseases, to name a few in patients.

**References**

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