SOX2OT, a long non-coding RNA involved in autophagy regulation

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Abstract
SOX2 overlapping transcript (SOX2OT) is a long non-coding RNA associated with cancer pathogenesis. It contributes to a variety of cellular functions and recent evidence propounds its association with autophagy process. It has been showed that SOX2OT can regulate the expression of different autophagy associated factors in human cells with different mechanisms, however more remains to be investigated.

Keywords: SOX2OT, lncRNA, Autophagy

Statement
Human SOX2OT, located in chromosome 3q26.3 encodes for a non-protein coding long RNA with different alternative splice variants (1). It was discovered as a gene associated with eye developmental disorders including microphthalmia and anophthalmia (2). The function of SOX2OT has been under investigation since its discovery. It has been shown that SOX2OT can regulate the embryonic stem cell in vertebrate (3) and also it has higher expression level in different tumor types taking role in pathogenesis of cancers(4).

Recently it was reported that SOX2OT can control the autophagy in osteosarchoma (5),
SOX2OT, a long non-coding RNA                                                                                             ... neuronal 
and eye disease; however the clear 
mechanism of autophagy regulation by 
SOX2OT needs more investigations.

pheochromocytoma cell (6), human podocytes 
cells (7). Autophagy is a conserved cellular 
homeostasis mechanism under stressful 
condition. It involves in pathogenesis of 
different disease like infections, 
neurodegenerative disease and cancer (8). Of 
notice, autophagy is a fundamental process in 
 lens fiber cells which SOX2OT shows high 
expression level (3).

SOX2OT variant 7 overexpressed 
osteosarcoma cell showed higher autophagy 
associated gene expression (Atg5, Atg7 and 
Beclin1), increased LC3-II/LC3-I ratio and 
decreased autophagy substrate P62; indicating 
SOX2OT variant 7 over expression can 
induce autophagy in osteosarcoma cell lines 
(U2OS and SaoS2). Overexpression of 
SOX2OT in osteosarcoma cancer stem cells 
contributes to stemness and Doxorubicin and 
Epigallocatechin Gallate (EGCG) toxicity (5).

In a recent study in the human podocytes 
exposed to hyperglycemia, it has been 
reported that SOX2OT knockdown can 
dercrease the Beclin-1 and Atg7 expression 
level, but an increase in p62 cellular level. In 
contrast, ectopic overexpression of SOX2OT 
deposited autophagy induction in human 
podocyte cells. It was illustrated that 
SOX2OT can decrease miR-9 inhibitory 
effect on SIRT-1 (autophagy inducer) by 
functioning as a Competing endogenous 
RNA, leading to enhanced autophagy. 
Accordingly it was postulated that, SOX2OT 
can attenuate human podocytes injury from 
hyperglycemia through autophagy related 
mechanism (7)

In other hand SOX2OT suppression can 
protect pheochromocytoma cells (PC2) from 
H2O2 induced injury through a mechanism 
associated to autophagy inhibition. SOX2OT 
knocked down PC2 cells showed less Beclin-1 
overexpression and p62 decrease under 
H2O2 treatment. Further investigation 
showed SOX2OT knockdown mitigates 
H2O2 induced injury via upregulation of miR-211 (6).

The above mentioned evidence highlights the 
importance of SOX2OT function in 
autophagy regulation in different conditions. 
Regarding the high expression of SOX2OT in 
human CNS and eye, it is worthy to study its 
association with autophagy related neuronal 
and eye disease; however the clear 
mechanism of autophagy regulation by 
SOX2OT needs more investigations.

References


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