

Role of Non-coding RNA in Cell Injury and Protection

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Advances in high-resolution microarray and next generation sequencing (NGS) technologies raised the importance of understanding the concept of non-coding RNA transcription from intergenic (non-coding) DNA regions. Recent studies have demonstrated a prevalent transcription (up to 80%) of the human genome, going well beyond the ~1% corresponding to protein-coding exons. Moreover, accumulating evidences indicate that intergenic RNAs have functional role in the gene regulatory networks. However, the significance and molecular mechanisms by which lncRNAs exert their function are currently under investigation. One possible mechanism by which lncRNAs play a functional role in gene regulation is the competing endogenous RNA (ceRNA) hypothesis. The ceRNA hypothesis postulates that specific RNAs including messenger RNAs (mRNAs), pseudogenes and lncRNAs can occupy pools of active microRNAs (miRNAs), consequently liberating other transcripts targeted by that set of miRNAs. Up to date, several ceRNAs were identified to have a critical role in various cellular events. Although recent studies have begun to reveal the function of a subset of lncRNAs having ceRNA function, still large amounts of lncRNAs are remained unelucidated owing to its diversity and tissue specific expression. We will discuss novel functions of non-coding RNAs including miRNAs and a novel lncRNA in injury and protection of the cells in solid organs such as kidney and liver.