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Editorial

IJMS Special Issue Editorial on "ncRNAS in Therapeutics"

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EDITORIAL

For many years, a small number of families of molecules with distinct functions constituted the stable and predictable RNA world of eukaryotic cells. Thus, the translational machinery was structured by ribosomal RNAs, the genetic information was transferred from the nucleus to the cytoplasm by hnRNA/mRNAs, and several short RNAs (tRNAs, snRNAs, snoRNAs) performed additional structural or regulatory functions in translation, splicing, etc. The RNA world, sometimes referred to as the RNAome, was far richer and more complicated than expected, according to the DNA/RNA sequencing revolution at the turn of the 20th century. Indeed, the ENCODE pilot study showed in 2007 that over 90% of the human genome was extensively transcribed [1], resulting in an astounding quantity of short or long non-coding RNAs (ncRNAs) that could be distinguished based on their size, subcellular location, and function.Consequently, novel components like miRNAs, eRNAs, circRNAs, AS-RNAs, sponge-RNAs, etc. have been added to the number of RNA families, many of which are linked to human disorders [2]. Because of their diverse range of functions, these ncRNAs may be used in disease treatments by upregulating or downregulating ncRNAs whose expression is changed in human illnesses.

This Special Issue, "ncRNAS in Therapeutics," focuses on this crucial area of study by offering examples of ncRNA applications and discussing the methods for delivering certain RNAs to cells and tissues. Three microRNAs (miR-142, miR-146a, and miR-223) were found to be significantly upregulated in drug-resistant patients and could be used as diagnostic circulating molecules of drug treatment resistance.

De Benedittis and colleagues [3] conducted a pilot study on the usefulness of six miRNAs (miRNAs) as biomarkers of drug resistance in temporal lobe epilepsy.This is especially intriguing because many TLE patients do not respond well to antiseizure medication (ASM) treatment. Therefore, it is evident that early identification of responding patients is necessary. The authors came to the conclusion that separating drug-sensitive from drug-resistant TLE patients may be possible by expression analysis of circulating miR-142 and miR-223. Di Fiore and colleagues [4] examined recent data on the usefulness of miRNA determination for the diagnosis and treatment of uncommon gynecological tumors linked to a bad prognosis, continuing this line of research in the miRNA field. These authors described how the expression of miRNAs is changed in ovarian cancers (epithelial and nonepithelial), vulvar carcinomas, malignant melanomas of the female genital tract, gestational trophoblastic disease (GTD), and uterine tumors (sarcomas and carcinosarcomas).In order to provide a mechanistic understanding of the oncogenic processes, they further expanded the research into their suspected targets.

Regarding the lncRNA side, Kuwara and colleagues [5] talked about ncRNAs (lncRNAs and miRNAs) that are involved in myocardial infarction and cardiac remodeling following myocardial infarction. They also looked into preclinical treatments that target these ncRNAs and their possible harmful effects. Conversely, cols and Aurilia. [6] examined the molecular mechanisms underlying the roles of lncRNAs as positive or negative regulators in the processes of osteoblastogenesis, osteoclastogenesis, and bone tumorigenesis. Their goal was to find novel biomarkers for

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the early detection of diseases affecting the bones and for the creation of fresh treatment approaches.

Two technical comments are also included in this Special Issue. The manufacture of circRNAs was reviewed by Lee and colleagues [7] with the goal of avoiding the stability issues that are often associated with RNAs and, as a result, enhancing their translation, which is crucial for their use as therapeutic agents or in the creation of vaccines. The authors provided a thorough overview of the application of chemical, enzyme, or ribozyme-based techniques for circularizing RNAs and outlined the present obstacles that need to be removed in order to make this intriguing tool more widely used. However, Hueso and colleagues [8] talk about the issues that prevent ncRNAs from being used in clinical settings, particularly those related to tissue-specific delivery of the RNA molecules, methods to make them more stable, and "on-target" and "off-target" adverse effects.With a focus on using nanoparticles as delivery vehicles, their main goals were to: (i) develop better algorithms for more effective hybridization to targets; (ii) develop new chemistries for stabilizing RNAs; and (iii) develop more effective vehicles for specific targeting. Finally, the authors talked about the challenges that the therapeutic application of nucleic acids for ncRNA therapy faces. An overview of the RNAome's intricacy and potential applications in the management of human illnesses is provided in this special issue. There will undoubtedly be a remarkable surge in innovative strategies and technological advancements in the years to come to enable the use of RNAs as therapeutic agents to treat human illnesses.

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