The scientific interest in dealing with microRNA is growing every day in parallel with the increasing feasibility of using microRNA for the early diagnosis of diseases and as a strategy for disease prevention and cure.

In the first 2022 issue of the MicroRNA journal, these aspects are specifically reported and discussed.

MicroRNA alteration is a fundamental pre-requisite for cancer development, being established that no cancer can arise in the absence of microRNA alterations. Accordingly, the mechanisms of microRNA physiology explored by Kokolo et al. are pivotal to shed light on the post-genomic control of gene expression. MicroRNA alteration in tissues, but also as extra-cellular microRNA in blood and body fluids, has been explored as a possible diagnostic biomarker for the early detection of cancer and for the identification of high-risk subjects. In this regard, Oskuiie et al. propose new data dealing with thyroid cancer, which is widespread these days. The possibility of using microRNA as a biomarker is of high relevance due to the fact that thyroid cancer screening is not actually recommended by the international committees due to its high un-specificity. Gastric cancer is still one of the most common cancer worldwide. Mirzajani et al. report the possibility of using microRNA for its diagnosis and treatment giving a new perspective on the prevention and therapy of this disease.

Diet and lifestyle are the main risks or protective factors for cancer, depending on the microRNA pathway modulated. The ability of the dietary supplement to modulate microRNA is discussed by Postnikov et al. Betel represents a risk factor for oral cancer that recognize a specific microRNA alteration profile, as reported by Manvar et al. MicroRNA also plays an important role in diabetes pathogenesis. Insulin growth factor production is activated by protease Lin28, an established inhibitor of the microRNA machinery activation with reference to the let-7 family. Accordingly, diabetes triggers glucose modulation by activating Lin28, in turn activating insulin growth factor ribosome transduction. However, Lin28 promotes let-7 degradation, thus increasing the possibility that mutated oncogenes, whose expression is silenced by let-7, translate their oncogenic proteins. This molecular mechanism explains why diabetes is a risk factor for cancer appearance and progression. In this context, it is of particular interest the role exerted by microRNA during the gestational stage, when the Lin28 pathway is physiologically active. Seelan et al. reported that microRNA analysis can be used as a biomarker for birth defects early diagnosis, a finding that is interesting due to the possibility of detecting extracellular microRNA in the amniotic fluid. The relation between microRNA, insulin signaling pathway and gestational diabetes is explored by Bhushan et al.

On the whole, the papers included in this MicroRNA journal issue provide new and updated insights into the multiple applications of microRNA in biology and medicine.