INVESTIGATING THE ROLE OF PERIPHERAL BLOOD MICRORNAS AS POTENTIAL DIAGNOSTIC BIOMARKERS FOR OSTEOARTHRITIS

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INTRODUCTION:

Micro-ribonucleic acids (miRNA) are small non-coding RNAs with a fragment size of approximately 22 nucleotides. Recently, miRNAs have been found to be potential non-invasive biomarkers for osteoarthritis (OA). However, blood sample-associated miRNA types as potential biomarkers for OA progression remain unclear. Thus, the study investigated the potential blood miRNA biomarkers in OA.

METHODS:

A systematic review was conducted using Pubmed, Web of Science (WOS) and Scopus databases. Search keywords are 'miRNA' AND 'Osteoarthritis' AND 'Rat' AND 'Cartilage'. Focus subjects are rat miRNA expression in OA progression. Only pre-clinical studies were included in the review. Moreover, 12 weeks old rats were randomised into 2 groups: the anterior cruciate ligament transected (ACLT) group, to induce OA on the right knee, and the control group. Peripheral blood miRNA profiling analysis was conducted. Differential miRNAs expressions of ACLT groups in comparison to the healthy groups were determined. The identified miRNAs from the systematic review were compared with the differential miRNA expressions. Further analysed using the Kyoto Encyclopedia of Genes and Genomes (KEGG) and Gene Ontology (GO).

RESULTS:

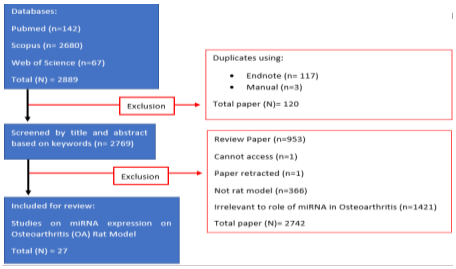

Figure 1: Flow chart of the systematic review.

Based on the systematic review, 27 out of 2889 articles are related to animal studies. The review revealed that there are 7 out of 30 reported miRNAs promote the secretion of pro-inflammatory mediators and cell apoptosis. The remaining miRNAs suppress pro-inflammatory mediators and trigger cartilage regeneration.

The miRNA profiling analysis demonstrated 90 differential miRNA expressions of ACLT groups. Upon comparison between differential miRNA expressions of ACLT groups and identified miRNAs from the systematic review, 14 potential miRNA biomarkers were found. The potential miRNAs activate two pathways (mucin type-O glycan biosynthesis and ECM-receptor interaction pathway). Among the potential miRNAs, miR-27a-3p consistently has the highest gene expressions among all GO categories, followed by miR-181c-5p and miR-29a-3p.

DISCUSSIONS:

The miRNAs are promising, non-invasive biomarkers for OA because of their size and relative stability in peripheral circulation [1]. The miR-27a has been noticed to be expressed in blood and involved in the etiology of OA [2]. The collA1 gene expressed in miR-29a-3p regulates chondrocyte differentiation and matrix synthesis [3].

CONCLUSION

The miR-27a-3p, miR-181c-5p and miR-29a-3p showed potential as OA biomarkers.

REFERENCES:

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