**Supplementary file**

**Table S1: Database and Search strategies**

| Database | Search strategy |
|---|---|
| PubMed | (micrornas[mh] or mirna[tiab] or non-coding rna[tiab] or mir[tiab] or mirna[tiab] or Microrna[tiab]) AND (Mesenchymal Stem Cells[mh] or Mesenchymal stem cell[tiab] or stromal cells[tiab] or Stem cell[tiab] or mesenchymal stromal cell[tiab] or Medicinal signaling cells[tiab]) AND (exosomes[mh] or exosomal[tiab] or Extracellular vesicles[tiab] or Microparticle[tiab] or Microvesicle[tiab] or Microparticle[tiab] or Nanovesicle[tiab] or Macrovesicle[tiab] or Nanoparticle[tiab] or syncytial nuclear aggregate[tiab] or shedding vesicle[tiab] or membrane vesicle[tiab] or budding vesicle[tiab] or blebbing vesicle[tiab] or extracellular body[tiab] or exovesicle[tiab]) AND (rheumatoid arthritis[mh] or osteoarthritis[tiab] or osteoarticular disease[tiab] or arthritis[tiab] or osteochondral defect[tiab] or osteochondral restoration[tiab] or collagen-induced arthritis (CIA)[tiab] or OA[tiab] or RA[tiab]) |
| Scopus | ( TITLE-ABS ( micrornas OR mirna OR "non-coding rna" OR mir OR mirna OR microrna ) ) AND ( TITLE-ABS ( "Mesenchymal Stem Cells" OR "Mesenchymal stem cell" OR "Stromal cells" OR "Stem cell" OR "mesenchymal stromal cell" OR "Medicinal signaling cells" ) ) AND ( TITLE-ABS ( exosomes OR exosomal OR "Extracellular vesicles" OR microparticle OR microvesicle OR microparticle OR nanovesicle OR macrovesicle OR nanoparticle OR "syncytial nuclear aggregate" OR "shedding vesicle" OR "membrane vesicle" OR "budding vesicle" OR "blebbing vesicle" OR "blebbing body" OR exovesicle ) ) AND ( TITLE-ABS ( "rheumatoid arthritis" OR osteoarthritis OR "osteoarticular disease" OR arthritis OR "osteochondral defect" OR "osteochondral restoration" OR "collagen-induced arthritis (CIA)" OR OA OR ra ) ) |
| Web of Science | (TS=(micrornas OR mirna OR "non-coding rna" OR mir OR mirna OR microrna)) AND (TS=("Mesenchymal Stem Cells" OR "Mesenchymal stem cell" OR "Stromal cells" OR "Stem cell" OR "mesenchymal stromal cell" OR "Medicinal signaling cells")) AND<br><br>(TS=( exosomes OR exosomal OR "Extracellular vesicles" OR microparticle OR microvesicle OR microparticle OR nanovesicle OR macrovesicle OR nanoparticle OR "syncytial nuclear aggregate" OR "shedding vesicle" OR "membrane vesicle" OR "budding vesicle" OR "blebbing vesicle" OR "blebbing body" OR exovesicle)) AND<br><br>(TS=("rheumatoid arthritis" OR osteoarthritis OR "osteoarticular disease" OR arthritis OR "osteochondral defect" OR "osteochondral restoration" OR "collagen-induced arthritis (CIA)" OR OA OR ra)) |

| Item | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| Type of bias | Selection bias | Selection bias | Selection bias | Performance bias | Performance bias | Detection bias | Detection bias | Attrition bias | Reporting bias |
| Domain | Sequence generation | Baseline characteristics | Allocation concealment | Random housing | Blinding | Random outcome assessment | Blinding | Incomplete outcome data | Selective outcome reporting |
| In vitro/in vivo studies applied MSC-derived exosomal microRNAs for OA | | | | | | | | | |
| 1 | Hu (2023) |  |  |  |  |  |  |  |  |  |
| 2 | Qiu (2021) |  |  |  |  |  |  |  |  |  |
| 3 | Qiu (2024) |  |  |  |  |  |  |  |  |  |
| 4 | Ragni (2020) |  |  |  |  |  |  |  |  |  |
| 5 | Rong (2021) |  |  |  |  |  |  |  |  |  |
| 6 | Wan(2022) |  |  |  |  |  |  |  |  |  |
| 7 | Wang (2021) |  |  |  |  |  |  |  |  |  |
| 8 | He (2020) |  |  |  |  |  |  |  |  |  |
| 9 | Li, , Lin, & Liu (2023) |  |  |  |  |  |  |  |  |  |
| 10 | Xu (2021) |  |  |  |  |  |  |  |  |  |
| 11 | Li (2021) |  |  |  |  |  |  |  |  |  |
| 12 | Zheng (2022) |  |  |  |  |  |  |  |  |  |
| 13 | Dong (2021) |  |  |  |  |  |  |  |  |  |
| 14 | Mao (2018) |  |  |  |  |  |  |  |  |  |
| 15 | Sun (2019) |  |  |  |  |  |  |  |  |  |
| 16 | Wang & Xu(2021) |  |  |  |  |  |  |  |  |  |
| 17 | Huang (2021) |  |  |  |  |  |  |  |  |  |
| 18 | Wang (2018) |  |  |  |  |  |  |  |  |  |
| 19 | Wang (2021) |  |  |  |  |  |  |  |  |  |
| 20 | Jin (2020) |  |  |  |  |  |  |  |  |  |
| 21 | Zhang, Qi (2023) |  |  |  |  |  |  |  |  |  |
| 22 | Dong (2024) |  |  |  |  |  |  |  |  |  |
| 23 | Lin (2021) |  |  |  |  |  |  |  |  |  |
| 24 | Liu (2023) |  |  |  |  |  |  |  |  |  |
| 25 | Liu (2022) |  |  |  |  |  |  |  |  |  |
| 26 | Meng (2023) |  |  |  |  |  |  |  |  |  |
| 27 | Sun (2022) |  |  |  |  |  |  |  |  |  |
| 28 | Wu (2019) |  |  |  |  |  |  |  |  |  |
| 29 | Ye (2022) |  |  |  |  |  |  |  |  |  |
| 30 | Meng (2023) |  |  |  |  |  |  |  |  |  |
| 31 | Zhao (2023) |  |  |  |  |  |  |  |  |  |
| 32 | Wang (2020) |  |  |  |  |  |  |  |  |  |
| 33 | Lou (2023) |  |  |  |  |  |  |  |  |  |
| 34 | Qiu,Xu, Yi & Ha (2020) |  |  |  |  |  |  |  |  |  |
| 35 | Liu(2018) |  |  |  |  |  |  |  |  |  |
| 36 | Xia, Wang, Lin, & Wang(2021) |  |  |  |  |  |  |  |  |  |
| 37 | Tao (2021) |  |  |  |  |  |  |  |  |  |
| 38 | Chen (2020) |  |  |  |  |  |  |  |  |  |
| 39 | Lu (2021) |  |  |  |  |  |  |  |  |  |
| 40 | Tao (2017) |  |  |  |  |  |  |  |  |  |
| 41 | kong (2023) |  |  |  |  |  |  |  |  |  |
| In vitro/in vivo studies applied MSC-derived exosomal microRNAs for RA | | | | | | | | | |
| 1 | Tavasolian (2020) |  |  |  |  |  |  |  |  |  |
| 2 | Meng (2020) |  |  |  |  |  |  |  |  |  |
| 3 | Su (2021) |  |  |  |  |  |  |  |  |  |
| 4 | Chen (2018) |  |  |  |  |  |  |  |  |  |
| 5 | Huang (2022) |  |  |  |  |  |  |  |  |  |
| 6 | Lin (2023) |  |  |  |  |  |  |  |  |  |
| 7 | Huang (2022) |  |  |  |  |  |  |  |  |  |
| 8 | Mi (2024) |  |  |  |  |  |  |  |  |  |
| 9 | Meng and Qiu (2020) |  |  |  |  |  |  |  |  |  |
| 10 | Ma (2022) |  |  |  |  |  |  |  |  |  |
| 11 | Li (2021) |  |  |  |  |  |  |  |  |  |
| 12 | Zhang (2023) |  |  |  |  |  |  |  |  |  |
| 13 | Wu (2021) |  |  |  |  |  |  |  |  |  |
| 14 | Wu (2022) |  |  |  |  |  |  |  |  |  |

| | Selection bias (Sequence generation) | Selection bias (Baseline characteristics) | Selection bias (Allocation concealment) | Performance bias (Random housing) | Performance bias (Blinding) | Detection bias (Random outcome assessment) | Detection bias (Blinding) | Attrition bias (Incomplete outcome data) | Reporting bias (Selective outcome reporting) |
|---|---|---|---|---|---|---|---|---|---|
| Low Risk | 55 | 55 | 44 | 38 | 18 | 21 | 17 | 55 | 55 |
| Unclear | 0 | 0 | 11 | 17 | 37 | 16 | 38 | 0 | 0 |
| High Risk | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 |