Table S1. the potential ncRNA biomarker for FMT.

| Noncoding RNA | effects | expression | target | disease | reference |
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| MicroRNA | | | | | |
| miR-369-5p | inhibit | Down-regulation | Over-expression of miR-369-5p decreased the expression of COL1A1 and α-SMA | Myocardial fibrosis | [117] |
| miR-199a (5p/3p) | promote/ inhibit | Up-regulation | ① Activate PI3K/AKT/MTOR signaling pathway<br>② Target caveolin-1 | Intimal cord fibrosis/skeletal muscle fibrosis/pulmonary fibrosis | [118-122] |
| miR-29 (a/b/c) | inhibit | Up-regulation / Down-regulation | ① Target VEGF-A<br>② Target Smad7, α-SMA<br>③ Target TPM1 | Corneal fibrosis/high myopia/myocardial fibrosis/pulmonary fibrosis/renal interstitial fibrosis/oral submucosal fibrosis | [26, 36, 38, 74, 102, 116, 123, 124] |
| miR-129-3p | promote | Down-regulation | Target Smad3 | Myocardial fibrosis | [125] |
| miR-23/27b-3p | promote | Up-regulation | Target TGFβR3, activate TGF-β/Smad signaling pathway | Atrial fibrillation due to myocardial fibrosis | [49] |
| miR-21 | promote | Up-regulation | ① Target PDCD4<br>② Affect ADAMTS-1/TGF- β signall pathway, degrade ECM<br>③ Target TGF-R III<br>④ Target Spry<br>⑤ Target PTEN, inhibit p-AKT/P-MTOR<br>⑥ Target smad7<br>⑦ Target jagged1<br>⑧ Target TGF-β2 | Systemic sclerosis/revascularization/myocardial fibrosis/scar/breast cancer | [68, 76, 83, 87, 95, 96, 111, 115, 126-136] |
| miR-146a | inhibit | Up-regulation / Down-regulation | ① Target Smad4<br>② Target CXCR4<br>③ Target C0-C1f | Diabetic cardiomyopathy/myocardial fibrosis | [63, 137] |
| miR-208a | promote | Up-regulation | Target DYRK2 | myocardial fibrosis | [138] |
| miR-let-7b/b/p | inhibit | Down-regulation / up-regulation | ① Target IL-8<br>② Target TGFBR1 | Breast cancer/pulmonary fibrosis | [24, 42, 139, 140] |
| miR-101a | inhibit | Down-regulation | Target TGFβR1 | myocardial fibrosis | [40] |
| miR-7a/b | inhibit | Down-regulation | Target Smad2 | myocardial fibrosis / pulmonary fibrosis | [141] |
| miR-214 | inhibit / | Down- | ① Target TGF-β1 | myocardial fibrosis | [142-144] |

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| | promote | regulation | ② Target TIMP1<br>③ Target NLRC5 | | |
| miR-127-3p | inhibit | Down-regulation | Regulate the expression of MAPK4、COL Ⅰ/Ⅱ、α-SMA | Airway scar | [88, 145] |
| miR-34a | inhibit | Down-regulation | ① Target FLIPS<br>② Target SIRT1<br>③ Target C-ski | Liver fibrosis/pulmonary fibrosis/myocardial fibrosis | [146-148] |
| miR-30c/d | inhibit | Down-regulation | ① Target TGFβR Ⅱ<br>② Target α-ZAP<br>③ Target JAG1 | myocardial fibrosis / pulmonary fibrosis | [46, 110, 149] |
| miR-145 | promote | Up-regulation | ① Target KLF4<br>② modulate various components of TGF-β signaling pathway | Pulmonary interstitial fibrosis/myocardial fibrosis | [150-158] |
| miR-126 | inhibit | Down-regulation | ① target DKK<br>② target PIK3R2 | Rheumatoid arthritis | [75, 159] |
| miR-335-3p | inhibit | Down-regulation | target smad2/3 | Hereditary gingival fibromatosis | [56] |
| miR-22 | inhibit | Down-regulation | ① Inhibition of ERK1/2 signaling pathway and negative regulation of CTGF expression<br>② Target CAV3 | myocardial fibrosis / pulmonary fibrosis | [92, 160] |
| miR-10a/b | inhibit / promote | Down-regulation | ① Target TGFβ1<br>② TWIST can promote the expression of Mir-10b and promote the progression of fibrosis | oral fibrosis/myocardial fibrosis | [161, 162] |
| miR-155 | promote | Up-regulation | ① Promote the expression of COL Ⅰ/Ⅱ、IL-6、IL-1β、TNF-α<br>② Target TP53INPI<br>③ Target AT(1)R，ERK1/2 activation was inhibited | Myocardial fibrosis/intimal vascular fibrosis | [91, 163-166] |
| miR-200a/b/c | inhibit | Down-regulation | ① Inhibit the expression of SIRT1,α-SMA<br>② Target ZEB2<br>③ Target ZEB1 | Myocardial fibrosis/oral submucosal fibrosis/buccal mucosa fibrosis | [113, 114, 167] |
| miR-195 | inhibit / promote | Up-regulation / Down-regulation | Target Check1 | Myocardial fibrosis | [168] |
| miR-125b | promote | Up-regulation | ① Target Sirtuin7<br>② Target SFRP5<br>③ Modulate RhoA signaling pathways | Liver fibrosis/myocardial fibrosis/aging skin damage | [169-172] |
| miR-27a- | inhibit | Down- | Inhibit the expression of α-SMA、 | myocardial fibrosis | [52, 64, 103] |

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| 3p | | regulation | smad2、smad4 | | |
| miR-140 | promote / inhibit | Up-regulation / Down-regulation | Inhibitor TGF-β1signaling pathway | myocardial fibrosis | [173] |
| miR-375 | inhibit | Down-regulation | Target P38 | pulmonary fibrosis | [174] |
| miR-327 | promote | Down-regulation | - | myocardial fibrosis | [175] |
| miR-133a | inhibit | Down-regulation | ① Target Furin<br>② Target TGFBR1 , inhibit the expression of CTGF、COL I a1 | Thoracic aortic aneurysm / pulmonary fibrosis | [176, 177] |
| miR-144 | inhibit | Down-regulation | Target CREB | myocardial fibrosis | [178] |
| miR-210-5p | inhibit | Up-regulation | Target STAT5A | Fibrosis of skin | [107] |
| miR-192 | promote | Up-regulation | Target SIP1（Smad interacting protein） | Hypertrophy scar fibrosis | [179] |
| miR-574-5p | promote | Up-regulation | Target ARID3A | myocardial fibrosis | [180] |
| miR-127-3p | promote | Up-regulation | - | Myofibroblast senescence phenotype | [88] |
| miR-152-3p | inhibit | Down-regulation | Inhibit wnt1/ β -catenin signaling pathway | myocardial fibrosis | [181] |
| miR-370 | inhibit | Up-regulation | Inhibit the expression of TGF-R2/smad3 | myocardial fibrosis | [47] |
| miR-130 | inhibit / promote | Down-regulation / up-regulation | ① Target TGF β R1<br>② Target peroxidase | myocardial fibrosis | [41, 182] |
| miR-218 | promote | Down-regulation | Target Cezanne ( deubiquitinating enzymes) | Gingival fibroblasts | [183] |
| miR-26 | inhibit | Down-regulation | ① Modulate TGF- β signaling pathway<br>② Target Keap1 | Pulmonary artery hypertrophy/myocardial fibrosis | [184, 185] |
| miR-33a-3p | inhibit | Up-regulation | Target DKK-1 | Systemic sclerosis | [100] |
| miR-338-3p | inhibit | Down-regulation | ①Target FGFR2<br>②Target PTEN | myocardial fibrosis | [77, 90] |
| miR-154 | promote | Up-regulation | Target DKK2 | myocardial fibrosis | [101] |
| miR-150 | inhibit | Up-regulation | Modulate the expression of c-myb | myocardial fibrosis | [186, 187] |
| miR-541-5p | inhibit | Down-regulation | Modulate the expression of PDE1A | pulmonary fibrosis | [188] |
| miR-1246 | promote | Up-regulation | Might target COL I | Oral submucosal fibrosis | [189] |
| miR-216a | promote | Up-regulation | target PTEN | Renal fibrosis | [190] |

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| miR-16-5p | inhibit | Down-regulation | Inhibit NOTCH signaling pathway | Systemic sclerosis | [109] |
| miR-497 | promote | Up-regulation | - | Oral submucosal fibrosis | [191] |
| miR-433 | promote | Up-regulation | ① Target AZIN1, repress TGF-β1;<br>② Target JNK1 | myocardial fibrosis | [23] |
| miR-9-5p | inhibit | Down-regulation | Target TGFβR2 | Fibrosis of the human dermis | [43, 48, 192] |
| miR-375 | inhibit | Down-regulation | Target FOXF1 | Fibrosis of mucosa | [193] |
| miR-122 | inhibit | Down-regulation | Target FN1 | Liver fibrosis | [194] |
| miR-503 | inhibit | Down-regulation | Target VEGFA、FGFR1 | pulmonary fibrosis | [78] |
| miR-449 | inhibit | Down-regulation | Target PLOD1 | Skin scar | [195] |
| miR-320 | promote | Up-regulation | Activate PI3CA/AKT/MTOR signaling pathway | myocardial fibrosis | [196] |
| miR-32-5p | promote | Up-regulation | Target DUSP1 | myocardial fibrosis | [89] |
| miR-424 | promote | Up-regulation | Target Slit2 | pulmonary fibrosis | [197] |
| miR-877-3p | inhibit | Down-regulation | Target Smad7 | myocardial fibrosis | [69] |
| miR-192-5p | inhibit | Up-regulation | Target IL-17RA , modulate Smad signaling pathway | Fibrosis of scar | [198] |
| Circular RNA | | | | | |
| circHIPK3 | promote | Up-regulation | ① Competitive binding with mir-338-3p promotes the expression of SOX4 and COL1A1<br>② Competitive binding with mir-30-3p promotes the expression of FOXK2 and promotes glycolysis<br>③ Competitive binding with miR-152-3p promotes the expression of TGF-β2 | pulmonary fibrosis / myocardial fibrosis | [22, 31, 32, 199-202] |
| Mmu-circ-0005019/circ-0099734 | inhibit | Down-regulation | Competitive binding with miR-499-5p promotes the expression of kcdn1/kcdn3/scn5a/kcnn3 | myocardial fibrosis | [203] |
| circAMD1 | inhibit | Down-regulation | Competitive binding with miR-27a-3p inhibits functional and phenotypic changes in p63 mutant human dermal fibroblasts | p63 mutant human dermal fibroblasts | [53] |
| circNLgn | promote | Up-regulation | NLgn173 binds to laminB1 and localizes it to the nucleus. NLgn173 binds to the ING4 and C8orf44GSK3 promoters, | Myocardial remodeling | [204] |

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| | | | resulting in abnormal deposition of collagen and class switching of fibroblasts. | | |
| circ0044226 | promote | Up-regulation | Competitive binding with miR-7 promotes sp1 expression | pulmonary fibrosis | [205] |
| circCUL2 | promote | Up-regulation | Competitive binding with miR-203a-3p activates MYD88/NF-κb pathway to transform pancreatic fibroblasts into cancer-associated fibroblasts, and secretes IL-6 to promote PDAC progression. | Double adenocarcinoma of pancreas | [206] |
| circfgfr2 | promote | Up-regulation | Competitive binding with miR-133 promotes the expression of MAP3K20/JNK/MAPK/KLF4, while KLF4 can bind to the circFgfr2 promoter to promote the expression of circFgfr2 | Muscle regeneration | [97] |
| circ-010567 | promote | Up-regulation | competitively binds with miR-141 and promotes the expression of TGF-β | myocardial fibrosis | [207] |
| circ-SCAR | inhibit | Down-regulation | Direct binding to ATP5B inhibits mitochondrial mROS output and class transformation in fibroblasts | Non-alcoholic steatohepatitis | [208] |
| circHECTD1 | promote | Up-regulation | Competitive binding with miR-142-3p promotes the expression of HMGB1, and then activates TGF-β/Smad pathway | Hypertrophic scar | [209] |
| circ-EP400 | promote | Up-regulation | deriving from M2 macrophages exosomes competitively bind to miR-15b-5p and promote the expression of FGF1/7/9 | Tendon injuries | [94] |
| circ-HNRNPH1 | inhibit | Up-regulation | Competitive binding with miR-216-5p promotes smad7 expression and then promote TGF-β1 degradation | Myocardial fibrosis occurs after ischemia | [70] |
| circ-0047339 | promote | Up-regulation | Competitive binding with miR-4691-5p promotes the expression of TSP-1(an endogenous activator of TGF-β) | Urethral scar fibrosis | [210] |
| Mmu-circ-37492/has-circ-0012138 | inhibit | Up-regulation | Competitive binding with miR-7682-3p promotes the expression of FGB | Renal fibrosis | [211] |
| lncRNA | | | | | |
| TUG1 | promote | Up-regulation | Activate TGF-β/Smad signaling pathway | Human periodontal membrane fibroblasts | [39] |
| DNM3OS | promote | Up-regulation | ① Activate TGF-β/Smad signaling pathway<br>② Competitive binding of miR-199a- | myocardial fibrosis / pulmonary fibrosis | [212] |

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| | | | 5p activates TGF-β signaling pathway | | |
| Fendrr | inhibit | Down-regulation | Binding to DNMT3B (DNA methyltransferase) promotes methylation of RASSF1A (RAS-associated region family 1A gene) | myocardial fibrosis | [93] |
| MEG3 | inhibit | Down-regulation | - | myocardial fibrosis | [213] |
| n341773 | inhibit | Down-regulation | Inhibit PI3K/AKT/mTOR signaling pathway | pulmonary fibrosis | [80] |
| MIR155HG | promote | Up-regulation | Competitive binding of miR-627 promotes the expression of HMGB1 | pulmonary fibrosis | [214] |
| GAS5 | inhibit | Down-regulation | ① Might competitively binding of miR-21<br>② inhibits the expression of p-Smad and α-SMA<br>③ binds smad3, promotes the binding of smad3 to PPM1A (protein phosphatase 1A), and dephosphorylates smad3 | myocardial fibrosis / Oral submucosal fibrosis | [54, 58-60, 82, 84, 215-218] |
| ASLNCS5088 | promote | Up-regulation | Derived from M2 macrophage exosomes, it competitively binds miR-200c-3p and promotes GLS (glutaminase) and α-SMA expression | Hypertrophic scar | [219] |
| HOTAIR | promote | Up-regulation | Through H3K27me3-mediated activation of notch signaling pathway to induce FMT/ directed EZH2 (histone methyltransferase) can induce specific target gene H3K27me3, inhibit miR-34a expression, and activate NOTCH signaling pathway | Systemic sclerosis | [112, 220] |
| CTD-2528L19.6 | inhibit | Early stage: Up-regulation Advanced stage: Down-regulation | Down-regulate fibrosis-related genes LRRC8C, DDIT4, THBS1, S100A8 and TLR7 | Idiopathic pulmonary fibrosis | [221] |
| ZFAS1 | promote | Up-regulation | Competitive binding of miR-150-5p promotes SLC38A1 expression | pulmonary fibrosis | [222] |
| Cfast（AK048087） | promote | Up-regulation | Binding to COTL1, competitively inhibits COTL1 interaction with TRAP1 (transforming factor receptor-β-associated protein 1), which enhances smad2/4 complex formation and TGF-β signaling | myocardial fibrosis | [223] |

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| PFL(NONMMUT022555) | promote | Up-regulation | Competitive binding of let-7d promotes the expression of PTAFR (platelet activating factor) | myocardial fibrosis | [224] |
| Safe（AK137033） | promote | Up-regulation | The RNA binding protein can be combined with the adjacent gene sfrp2 mRNA and lncRNA safe complex | Myocardial injury in rats | [105] |
| PFAL（MONMMUT021928） | promote | Up-regulation | Competitive binding of miR-18a promotes the expression of CTGF | pulmonary fibrosis | [81] |
| Rian | inhibit | Down-regulation | Over-expression of Rian or downregulation of Miat could reduce the expression of a-SMA, COLA1 and smad2/3 | Renal fibrosis | [225] |
| Miat | promote | Up-regulation | | | |
| TUG1 | promote | Up-regulation | Competitively bind of miR-29c | myocardial fibrosis | [39] |
| H19 | promote | Up-regulation | Derived from M2 macrophages, it competitively binds let-7a/ competitively binds miR-29b to promote cola1 expression | pulmonary fibrosis / Oral submucosal fibrosis | [37, 226] |
| NEAT1 | promote | Up-regulation | Competitive binding of miR-760 promotes the expression of TPM1 | Oral submucosal fibrosis | [227] |
| IAPF | promote | Up-regulation | H3K27ac activates the IAPF promoter, ATF3 binds to the IAPF promoter, IAPF transcription is enhanced, and it forms RNA-protein complex with ELAVL1/HUR, inhibits the fusion of autophagosomes and lysosomes, and controls the stability of EZH2, STAT1 and FOXK1 to inhibit autophagy | pulmonary fibrosis | [228] |
| LOC103691771 | promote | Up-regulation | Activate TGF-β-Smad2/3 signaling pathway | silicosis | [229] |
| SNHG7 | promote | Up-regulation | Competitive binding of miR-34-5p promotes ROCK1 expression | Myocardial remodeling | [230] |
| HOTTIP | promote | Up-regulation | Promote the expression of a-SMA、COLI、IL-6、TNF-a | myocardial fibrosis | [231] |
| SNHG1 | promote | Up-regulation | Competitive binding of miR-326 promoted the expression of SP1 | pulmonary fibrosis | [232] |
| LINC01518 | promote | Up-regulation | Competitively binds of miR-216b-5p | glaucoma | [233] |
| CRNDE | inhibit | Up-regulation | Smad3 promotes CRNDE, while CRNDE inhibits smad3 transcriptional activation of target genes | Diabetic myocarditis | [55] |
| LINC00312 | promote | Up-regulation | The expression of a-SMA and p-Smad was promoted by YBX1 | Oral submucosal fibrosis | [234] |
| SNHG20 | promote | Up-regulation | Competitive binding of miR-490-3p promotes the expression of TGFBR1 | silicosis | [45] |

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| LINC00963 | inhibit | Down-regulation | Competitively binds miR-143-3p | Corneal fibrosis | [235] |