**Table S1.** MicroRNAs expression after exercise in pre-clinical studies.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | MicroRNAs in Exercise | | | | |
| MicroRNAs | Targets | Source | Types of Exercises | Reference |
| In vivoexperimental models | | | | | | |
| 🡩 miR-27a, miR-155    🡫 miR-143 | ACE, AT1R  ACE2 | Heart samples | Chronic Adaptation  (12 weeks)  Wistar-Kyoto rats  Exercise training on treadmill | [234] |
| 🡩 miR-17-3p | TIMP-3  PTEN | Heart samples | Chronic Adaptation  (21 days total)  C57Bl/6 mice  Ramp swimming training model  Voluntary wheel training | [291] |
| 🡩 miR-222 | HIPK1 | Heart samples | Chronic Adaptation  (3 weeks total)  Ramp swimming model  Voluntary wheel training | [269] |
| 🡩 miR-19b, miR-30e, miR-133b, miR-208a  🡫 miR-99b, miR-100, miR-191a, miR-22, miR-181a | IGF1  PI3/AKT/mTOR  MAPK  p53 | Heart samples  Plasma | Chronic Adaptation  (8 weeks total)  Wistar albino rats  Swimming training  (90 min, twice daily)  5% caudal body weight workload | [273] |
| 🡩 miR-146a, miR-126  🡫 miR-155 | TRAF6 | Heart samples | Chronic Adaptation  (12 weeks)  Voluntary wheel training Exercise training on treadmill | [241] |
| 🡩 miR-29a, miR-101a | TGF-β  fos  COL1A1 | Heart samples | Chronic Adaptation  (8 weeks total)  Sprague dawley rats  Intermittent run exercise  (60 min, 5d/ week) | [292] |
| 🡩 miR-27a, miR-27b  🡫 miR-143 | ACE  ACE2 | Heart samples | Chronic Adaptation  (10 weeks total)  Wistar rats  Swimming training  Moderate and high volume  (60 min, 5d/ week)  5% caudal body weight workload | [256] |
| 🡩 miR-126 | PI3KR2 | Heart samples  Plasma | Chronic Adaptation  (10 weeks total)  Zucker rats  Swimming training  (60 min, 5d/ week) | [258] |
| 🡫 miR-214 | SERCA2A | Heart samples | Chronic Adaptation  (8 weeks total)  Wistar rats  Resistance training  (5d/ week; 80% of 1 RM) | [293] |
| 🡩 miR-1  🡫 miR-214 | NCX  SERCA2A | Heart samples | Chronic Adaptation  (10 weeks total)  Wistar rats  Swimming training  (60 min, 5d/ week; mild-intensity long-period)  3% caudal body weight workload | [294] |
| 🡩 miR-29c  🡫 miR-1, miR-133a, miR133b | COL1A1  COL3A1 | Heart samples | Chronic Adaptation  (10 weeks total)  Wistar rats  Swimming training  (60 min, 5d/ week)  5% caudal body weight workload | [295] |
| 🡩 miR-126 | SPRED1  PI3KR2 | Heart samples | Chronic Adaptation  (10 weeks total)  Wistar rats  Swimming training  (60 min, 5d/ week)  5% caudal body weight workload | [257] |
| 🡩 miR-21, miR-144, miR-145  🡫 miR-124 | PTEN  PIK3A  TSC2 | Heart samples | Chronic Adaptation  (8 weeks total)  Wistar rats  Swimming training  (60 min, 5d/ week)  5% caudal body weight workload | [246] |
| 🡩 miR-336-5p, miR-130b-5p, let7d-3p, miR-466c-5p, miR-324-3p, miR-146b-5p, miR-132-3p, miR-21-5p, miR-187-3p, miR-29b-5p, miR-324-5p, miR-214-5p, miR-140-5p, miR-152-5p, miR-99b-5p, miR-130a-5p, miR-455-5p, miR-27b-3p, miR-23b-3p, miR-652-5p, miR-199a-3p, miR-223-5p, miR-421-3p, miR-27a-5p, miR-24-5p, miR-34a-3p, miR-140-3p, miR-125b-5p, miR-145a-5p, miR-192-5p, miR-139-5p, miR-199a-5p, miR-674-3p, miR-191-5p, miR-28-3p, miR-195-5p, miR-598, miR-429, miR-224, miR-425, miR-221  🡫 miR-701-5p, miR-220, miR-144-3p, miR-694, miR-485-3p, miR-136-5p, miR-384-3p, miR-376c-3p, miR-208b-3p, miR-411-3p, miR-141-5p, miR-1894-3p, miR-9a, miR-687, miR-451-5p | TNF-α  COL1A1  MMP9  PTEN  AKT1  AMPK  p38  BCL2 | Heart samples | Chronic Adaptation  (10 weeks total)  Wistar rats  Aerobic run training  (Progressive intensity; 5d/ week) | [253] |
| 🡩 miR-503, miR-465b-5p, miR-542-3p  🡫 miR-652 |  | Heart samples | Chronic Adaptation  (6 weeks total)  C57Bl6 mice  Swimming training  (3x30 min, each week) | [296] |
| 🡫 miR-26b, miR-143 | IGF1R  GATA-4  NFAT1C  GSK3B | Heart samples | Chronic Adaptation  (35 days total)  Balb/c mice  Aerobic metal wheels training | [261] |
| 🡩 miR-21, miR-30b  🡫 miR-1 | BCL-2  p53  PDCD4  DRP-1 | Heart samples | Chronic Adaptation  (8 weeks total)  Swimming training  (2 times/day, 5d/ week) | [247] |
| 🡩 miR-23a, miR-27a | PTEN  Casp7  FoxO1 | Skeletal muscle samples | Acute Response  Resistance exercise  (Muscle overload) | [255] |
| 🡩 miR-29c  🡫 miR-1 | COL1A1  COL3A1 | Heart samples | Chronic Adaptation  (10 weeks total)  Zucker rats  Swimming training  (60min, 5d/ week, with 4% of body weight workload) | [297] |

**Table S2.** MicroRNAs expression after exercise in clinical studies.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | MicroRNAs in Exercise | | | |
| MicroRNAs | Targets | Source | Types of Exercises | Reference |
| Clinical studies | | | | |
| 🡩 miR-126, miR-133 | CPK | Plasma | Acute Response  Single symptom-limited spiroergometry test  Cycling 4 h at 70% of anaerobic threshold  Marathon run  Eccentric resistance exercise | [260] |
| 🡫 miR-486 | PTEN | Serum | Acute Response  Cycle ergometry 60 min.  at 70% VO2max  Chronic Adaptation  (4 weeks total)  Systematic—cycling at 70% VO2max  (3 x30 min/ week) | [298] |
| 🡩 miR-1, miR-126, miR-133a, miR-134, miR-146a, miR-208a, miR-499-5p | CPK  NT-proBNP  hsCRP | Plasma | Acute Response  Marathon run  Immediately after run  (decreased after 24 h) | [251] |
| 🡩 miR-1, miR-133a, miR-206, miR-208b, miR-499 |  | Plasma | Acute Response  Marathon run  Immediately after run | [290] |
| 🡩 miR-1, -133a, -206 |  | Plasma | Acute Response  Marathon run  Immediately after run | [278] |
| 🡩 let-7d-3p, let-7f-3p  miR-29a-3p, miR-34a-5p, miR-125b-5p  miR-132-3p, miR-143-3p,  miR-148a-3p, miR-223-3p, miR-223-5p  miR-424-3p, miR-424-5p |  | Serum | Acute Response  Marathon run  Immediately after run  (decreased after 24 h) | [262] |
| 🡩miR-1, -30a, -133a  🡫miR-26a, -29b |  | Plasma | Acute Response  Marathon run  Immediately after run  (decreased after 24 h)  Immediately after run | [231] |
| 🡩 miR-1, -133a, -206 |  | Plasma | Acute Response  Marathon run  Immediately after run  (decreased after 24 h) | [279] |
| 🡩miR-1, miR-133a, miR-133b, miR-139-5p, miR-143, miR-145, miR-223, miR-330-3p, miR-338-3p, miR-424  🡫 miR-30b, miR-106a, miR-146, miR-151-3p, miR-151-5p, miR-221, miR-652, let-7i  🡩 miR-103, miR-107,  🡫 miR-21, miR-25, miR-29b, miR-92a, miR-133a,  miR-148a, miR-148b, miR-185,  miR-342-3p, miR-766, let-7d |  | Plasma | Acute Response  cycle ergometry test  at 65% Pmax  1-3 hs after exercise  Immediately after exercise  Chronic Adaptation  (12 weeks total)  Systematic endurance cycle  ergometry training,  3-5 days after training | [244] |
| 🡩miR-1, miR-133a, miR-133b, miR-206  miR-485-5p, miR-509-5p, miR-517a  miR-518f, miR-520f, miR-522, miR-553, miR-888 |  | Plasma | Acute Response  High intensity interval exercise  Immediately after  Vigorous intensity continuous exercise  Immediately after | [299] |
| 🡩 miR-181b, miR-214  🡩 miR-1, miR-133a, miR-133b, miR-208b |  | Plasma | Acute Response  Uphill treadmill test (concentric)  Immediately after  Downhill treadmill test (eccentric)  2-6 hs after exercise | [300] |
| 🡩miR-149  🡫 miR-146a, miR-221 |  | Serum | Acute Response  Resistance exercise  (bench press and leg press)  3 days after exercise | [284] |
| 🡩 miR-1, miR-133a, miR-133b, miR-206, miR-208b, miR-499 |  | Plasma | Chronic Adaptation  (5 months total)  Systematic resistance training  36-72 hs after training | [301] |
| 🡩 miR-1, miR-133a, miR-133b, miR-181a  🡫 miR-9, miR-23a, miR-23b, miR-31  🡩 miR-1, miR-29b | HDAC4  NRF1 | Skeletal muscle samples | Acute Response  (Cycle ergometer, 60 min, 70% VO2peak)  Chronic Adaptation  (10 days total)  Cycling | [287] |
| 🡩 miR-136, miR-200c, miR-376a, miR-377, miR-499b, miR-558  🡫 miR-28, miR-30d, miR-204, miR-330, miR-345, miR-375, miR-449c, miR-483, miR-509, miR-520a, miR-548an, miR-628, miR-653, miR-670, miR-889, miR-1245a, miR-1270, miR-1280, miR-1322, miR-3180 |  | Skeletal muscle samples | Chronic Adaptation  (12 weeks total)  Resistance training  (8x5 leg press repetitions, 80% of 1 RM) | [302] |
| 🡩miR-451  🡫 miR-26a, miR-29a, miR-378 |  | Skeletal muscle samples | Acute Response  Resistance exercise  (High vs. Low responders) | [288] |
| 🡩miR-125a, miR-145, miR-181b, miR-193a, miR-197, miR-212, miR-223, miR-340, miR-365, miR-485, miR-505, miR-520d, miR-629, miR-638, miR-939, miR-940, miR-1225, miR-1238  🡫 miR-let-7i, miR-16, miR-17, miR-18a, miR-18b, miR-20a, miR-20b, miR-22, miR-93, miR- 96, miR-106a, miR-107, miR-126, miR-130a, miR-130b, miR-151, miR-185, miR-194, miR-363, miR-660 |  | Serum | Acute Response  Cycle ergometer exercise  (10x2min bouts, 1min rest interval between each bout, 76% VO2peak) | [303] |
| 🡩miR-7, miR-15a, miR-21, miR-26b, miR-132, miR-140, miR-181a, miR-181b, miR-181c, miR-338, miR-363, miR-939, miR-940, miR-1225  🡫 miR-let-7e, miR-23b, miR-31, miR-99a, miR-125a, miR-125b, miR-126, miR-130a, miR-145, miR-151, miR-199a, miR-199b, miR-221, miR-320, miR-451, miR-486, miR-584, miR-652 |  | PBMC | Acute Response  Cycle ergometer exercise  (10x 2min bouts, 1min rest interval between each bout, 76% VO2peak) | [249] |
| 🡩miR-let-7f, miR-21, miR-29c, miR-223  🡫 miR-let-7f, miR-21, miR-29c, miR-223 |  | PBMC | Chronic Adaptation  (18 weeks)  Running exercise  (3x/week, 60 min) | [248] |
| 🡩miR-7, miR-29a, miR-29b, miR-29c, miR-30e, miR-142, miR-192, miR-338, miR-363, miR-590  🡫 miR-let-7e, miR-126, miR-130a, miR-151, miR-199a, miR-221, miR-223, miR-326, miR-328, miR-652 |  | PBMC | Acute Response  Cycle ergometer exercise  (10x 2min bouts, 1min rest interval between each bout, 77% VO2peak) | [259] |
| 🡩miR-15a, miR-29b, miR-29c, miR-30e, miR-140, miR-324, miR-338, miR-362, miR-532, miR-660  🡫 miR-23b, miR-130a, miR-151, miR-199a, miR-221 |  | Serum | Acute Response  Cycle ergometer exercise  (10x 2min bouts, 1min rest interval between each bout, 82% VO2max) | [275] |
| 🡩miR-1, miR-486, miR-494 |  | Serum | Acute Response  Aerobic exercise  (Endurance athletes, runners, cyclists and triathletes) | [304] |
| 🡩 miR-21, miR-146a, miR-221, miR-222  🡩 miR-20a, miR-21, miR-146a, miR-221, miR-222 |  | Serum | Acute Response  Cardiopulmonary exercise test  Chronic Adaptation  (90 days)  Rowing training, 5Km, 1-3 h per session, 20-24 strokes/min) | [250] |
| 🡩 miR-376a  🡫 miR-16, miR-27a, miR-28 |  | Plasma | Chronic Adaptation  (5 months total)  Aerobic run exercise training  (4 days/week) | [305] |
| 🡩 miR-19a, miR-19b, miR-20a, miR-26b, miR-143, miR-195 | p-AKT  p-S6K1 | Serum | Acute Response  Resistance exercise  (3x bilateral knee extension and leg press, 10 rep, 80% of 1 RM) | [274] |
| 🡩 miR-222 | HIPK1 | Plasma | Acute Response  Heart failure patients  Bicycle Ergometry Test | [269] |

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