**Sup. Table 2.** *The effects of downregulated miRNA in papillary thyroid cancer cell lines and tissue.* PTC; papillary thyroid carcinoma and adjacent non-cancerous tissue, PTH; papillary hyperplasia BTL; benign thyroid lesions, NT; normal thyroid tissue, NG; nodular goiter, LNM; lymph node metastasis, FTC; follicular thyroid cancer, TCV; tall cell variant, Classification of Malignant Tumors, ATC; anaplastic thyroid carcinomas.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **MiRNA** | **Cell line** | **Animal model** | **Tissue sample size** | **Clinicopathological features** | **Biological function**  | **Target** **Signaling pathway** | **Ref.** |
| 7 | TPC-1K1BCPAP |  | 10 PTC | negative correlation:- tumor size - LNM | Inhibition of: - proliferation- migration-invasionRegulation of:-cell cycle  | - CKS2 axis (cyclin B1 (G2/mitotic-specific cyclin-B1) and cdk1 (cyclin-dependent kinase 1) | [56] |
| 7-5p | TPC-1 |  |  |  |  | Reduced Multidrug resistance (MDR) | [57] |
| 791 | TPC-1 BCPAP HTH83 |  | 80 non-metastatic PTC  | - shorter postoperative survival- positive correlation of expression with prognosis  | Inhibition of: - proliferation | Cell cycle inhibition (downregulation of Cyclin D1, CKD6 and CDK4 induction of cyclin inhibitor P21) | [58] |
| 144 | IHH4 |  | 63 PTC | - differentiate PTC with tumor sizes ≥2 cm  | Inhibition of: - proliferation | - Targeting *WWTR1*Hippo signaling pathway | [59] |
| 144 | BCPAP TPC-1 | male nude mice | 64 PTC | - advanced T stage | Inhibition of: - proliferation- tumor growth Induction of G1 arrest | -Targeting *E2F8* /CCND1 axis | [60] |
| 144-3p |  |  | 84 PTC |  | Inhibition of: - migration- invasion | Target of *SphK1*Targeting *FN1* | [61,62] |
| 1266 | K1BCPAP TPC-1 |  | 38 PTC |  | Inhibition of: - proliferation - migration- invasion | Targeting *FGFR2* | [63] |
| 335 | TPC-1 HTH83 K1 BCPAP |  | 59 PTC |  | Inhibition of: - proliferation - migration- invasion | Targeting *ZEB2* | [64] |
| 335-5p | TPC-1 |  | 20 PTC |  | Induction of:-apoptosisInhibition of - migration- invasion | Targeting *ICAM-1* | [65] |
| 718 | TPC-1 K1 |  | 15 PTC |  | Inhibition of:- proliferation- migration - invasionRegulation of:- glucose metabolism | Targeting *PDPK1*Akt-mTOR signaling pathway | [66] |
| 148a | TPC-1 |  | 6 metastatic PTC6 controls | - LNM |  | STAT3 and PI3K/AKT signaling pathway | [67] |
| 148a | PTC-1 BCPAP K1 | severe combined immune-deficiency mice | 81 PTC |  | Inhibition of: - proliferation- migration - invasiveness Inhibition of: - tumor growth | Repression of cyclin-dependent kinase 8 (CDK8)  | [68] |
| 9-5p |  |  | 25 PTC 25 BTL |  | Induction of apoptosis | Targeting *BRAF* | [69] |
| 449 | TPC-1 K1 IHH-4 CGTH-W3 | male nude mice | 25 PTC |  | Inhibition of proliferation cell cycle arrest | Suppression of β-catenin nuclear translocation- Inhibition of Wnt/β-catenin signaling (c-Myc, cyclin D1, TCF-1 and LEF-1) | [70] |
| 202-3 | TPC-1SW1736 BCPAP K1 |  | 96 PTC | - LNM | Inhibition of invasiveness | Inhibition of Wnt/β-catenin signaling | [71] |
| 126 | K1B-CPAP8505-CMB-1 BHT-101 |  | 51 PTC37 follicular PTC13 undifferentiated thyroid carcinomas13 LNM thyroid 21 BTL | - metastatic PTC - LNM- undifferentiated TC | - Inhibition of proliferation- Cell cycle arrest in G0-G1- Promotion apoptosis | Inhibition of *VEGF-A* expression | [72] |
| 126 |  |  | 30 PTC | - LNM- tumor size - TNM stage | Inhibition of: -proliferation - colony formations- migration- invasionPromotion of:- apoptosis - cell cycle arrest at G1  |   LRP6 🡪 Wnt/β‑catenin signaling | [73] |
| 622 | 8505CTPC-1SW1736 | BALB/c-nude mice | 42 PTC | - advanced TNM stage- LNM | Inhibition of: - proliferation- migration -invasion Suppression of: - tumor growth in vivo  | Inhibition of *VEGF-A* expression | [74] |
| 150 | TPC-1 BCPAP CGTH-W3 HTH83 |  | 45 PTC | - TNM - LNM- poor prognosis | Inhibition of: - proliferation- migration -invasion  | Inhibition of *ROCK1* expression | [75] |
| 205 | K1B-CPAP8505C MB-1BHT-101 |  | 51 PTC 37 follicular PTC 13 undifferentiated TC 13 LNM TC 14 NG7 NT  | - LNM-TNM (T3 and T4 carcinomas - stage 3 and stage 4  | Inhibition of:- proliferationInduction of:- cell cycle arrest in G0-G1- apoptosis | Inhibition of *VEGF-A* expression | [76] |
| 205 | 8505-C BCPAP TPC-1 |  | 132 PTC |  | Inhibition of:- proliferation - migration- invasion | Suppression of *YAP1* | [77] |
| 204-5p | TCP-1 BCPAP | male BALB/c nude mice |  |  | Inhibition of:- proliferation - tumorigenicityInduction of:- cell cycle arrest- apoptosis | Suppression of *IGFBP5* | [78] |
| 204-5p | BCPAP TPC-1 |  | 50 PTC | - extrathyroidal extension- high T-stage- LNM- BRAF V600E mutation- aggressive tall cell variant |  | promoter DNA methylation of *TRPM3* gene | [79] |
| DICER | BCPAPTPC1 KTC1 |  | 28 PTC | - extrathyroidal extension- angiolymphatic invasion- multifocality- LNM- distant metastasis - recurrence- BRAF-V600E mutation |  |  | [80]  |
| DICER | TPC-1 BCPAPFRO 8505c |  | 7 NT31 PTC 14 ATC |  | -regulatation cell proliferation - silencing impairs thyroid cell differentiation |  | [81] |
| 451a |  |  | 19 PTC 5 NT | - tall cell variant- advanced stage - extrathyroidal extension |  | Suppression of *MIF, c-MYC* and *AKT1* and attenuates AKT/mTOR pathway activation | [82] |
| 215 | K1BCPAP TPC-1IHH4 | male BALB/c nude mice | 48 PTC | -  LNM | Inhibition of:- proliferation- metastasis | Suppression of EMT via the ARFGEF1/AKT/GSK-3β/Snail signaling | [83] |
| 766 | HTH83 TPC-1BCPAP | female BALB/c nude mice | 47 PTC | - TNM stage - LNM | Inhibition of:- proliferation- colony formation- migration- invasionInduction of: - apoptosis Reduction of: - tumor growth in vivo | Suppression of *IRS2* 🡪 phosphoinositide 3‑kinase (PI3K)/protein kinase B (Akt) pathway | [84] |
| 486-5p | TPC-1 BCPAP |  | 66 PTC40 patients  | - LNM | Inhibition of:- migration- invasion - EMT process  | Upregulation of E-cadherin Downregulation of Vimentin expressionDownregulation of Gli1 expression🡪Suppression of Hedgehog (Hh) signaling pathway  | [85] |
| 486-5p |  |  | 59 PTC |  |  | Suppression of *KIAA1199*EMT axis | [86] |
| 486-5p |  |  | 507 PTC 59 NT | - cancer stage - pathologic LN - metastasis - recurrence - worse overall survival |  |  | [87] |
| 486-5p | K-1TPC-1 | male BALB/C nude mice | 20 PTC |  | Inhibition of:- proliferation Induction of:- apoptosisReduction of: - tumor growth in vivo  | Suppression of *FBN1* expression | [88] |
| 940 |  |  | 266 PTC280 NG300 healthy controls  | - lower in bilateral tumor than in unilateral tumor- extrallyroidal invasion- cervical LNM or distant metastasis  |  |  | [89] |
| 15a |  |  | 266 PTC280 NG300 healthy controls | - lower in bilateral tumor than in unilateral tumor - lower in multicentricity than in unicentric tumor- extrallyroidal invasion- cervical LNM or distant metastasis |  |  | [89] |
| 16 |  |  | 266 PTC280 NG300 healthy controls | - lower in multicentricity than in unicentric tumor- extrallyroidal invasion- cervical LNM or distant metastasis |  |  | [89] |
| 26a-5p | K1 BCPAP | 24 nude mice | 58 PTC | - advanced TNM stages - LNM | Inhibition of: - proliferation- invasion- metastasis  | Targeting *Wnt5a* | [91] |
| 564 | TPC-1 BCPAP HTH83 |  | 47 PTC | - LNM- TNM | Inhibition of: - proliferation- migration- invasionInduction of:- apoptosis | Inhibition of *AEG-1*Deactivation of PTEN/Akt pathway  | [92} |
| 199a-3p | BCPAP KTC-1 | BALB/c nude mice | 136 PTC52 NT |  | Inhibition of:- migration- invasion- cell growthSuppression of cancer development in vivo | Hypermethylation of the miR-199a-3p promoter Targeting *RAP2a* and *DNMT3a* | [93] |
| 30c-2-3p876138139-5p138-1-3p873504152199-5p |  |  | 59 normal 495 PTC8 LNM | - LNM | Tumorigenesis process of thyrocytes |  | [94] |
| 139 | TPC-1 HTH83BCPAP |  | 43 PTC |  | Inhibition of: - proliferation- invasionInduction of:- apoptosis | Targeting FN1 | [95] |
| 152 |  |  | 499 PTC58 NT  | - LNM- extra-thyroidal invasion | PTC: - invasion - progression  |  | [51] |
| 20b | K1 TPC-1 | BALB/c nude mice | 47 PTC | - cervical LNM- TNM staging | Inhibition of - cell viability- migration-invasion | Repression of *SOS1* or *ERK2* 🡪Inhibition of MAPK/ERK Signaling Pathway | [96] |
| 326 | TPC-1BCPAP CGTH-W-3 HTh83 | female mice | 60 PTC |  | Inhibition of: - proliferation- clone formation ability- cell cycle (G1-accumulation)Reduction of tumorigenesis in vivo (decrease of tumor volume and weight) | Targeting *MAPK1* and *ERBB4*Suppression of f Ki-67, MAPK1 and ERBB4Inhibition of:Vimentin, N-cadherin Enhancement of E-cadherin | [97] |
| TG | K1 |  | 14 PTC14 NT  |  |  | Reduction of *MAP4K4* | [98] |
| 369-3p | TPC-1 GLAG-66 |  | 59 NT 363 PTC 100 FTC 36 TCV 14 unknown types  | - lower overall survival | Inhibition of: - proliferationInduction of:- apoptosis | Targeting *TSPAN13* | [99] |
| 448 | K-1TPC-1B-CPAP8505CBHT101 | male BALB/c-null nude mice | 87 PTC | - N stage- LNM- TNM stage  | Inhibition of: - proliferation- tumor growth | KDM5B-mediated Repression of *TGIF1*  | [100] |
| Let-7f |  |  |  |  | - restricted cell proliferation | Suppression of *MAPK* activation  | [53]  |
| Let-7a | TPC-1BCPAP  |  |  57 PTC30 NG |  | Inhibition of: - proliferation- migration- invasion | Lin28 repress the biogenesis of mature let-7Lin28A/let-7a/c-Myc pathway | [37] |
| Let-7a | TPC-1 BCPAP | male BALB/cA nude mice | 47 PTC21 NT |  | Inhibition of: - proliferation- colony formation- migration- invasionSuppression of tumor growth | Repression of *AKT2* | [101] |
| Let-7e | BCPAP TPC-1 | male athymic BALB/c nude mice |  |  | Inhibition of: - migration- invasionSuppression of tumor growth | Downregulation of *HMGB1* | [101] |
| 654-3p | TPC-1BCPAPKTC-2 | FVB transgenic mice(*BRAFT1799A*) | 467 PTC |  | Inhibition of:- proliferation- migration - metastasis  |  EMT markers (*Zeb1, Zeb2, Snai1* and *Snai2)* | [104] |
| 361-5p | 8505CTPC-1 SW1736 | BALB/c nude mice | 48 PTC |  | Inhibition of:- proliferation- colony formation- migration - invasion- tumor growth *in vivo* | Repression of *ROCK1* | [105] |
| 497 | TPC-1K1HTH83 BCPAP |  | 43 PTC |  | Inhibition of:- proliferation- migration - invasion | Repression of *AKT3*miR‑497/AKT3 signaling pathway | [106] |
| 744 | TPC-1BCPAP HTH83 |  | 31 PTC |  | Inhibition of:- proliferation- invasion | Repression of *NOB1* | [107] |
| 613 | TPC-1BCPAPK1 | BALB/c-nude mice | 20 PTC |  | Inhibition of:- proliferation- invasion- migration- tumor growth *in vivo* | Repression of *SphK2* | [108] |
| 4500 | HTH83TPC-1K1NIM-1B-CPAP |  | 50 PTC | - lower survival rate - LNM- tumor stage - metastasis- extrathyroidal extension - multifocality | Inhibition of:- proliferation- invasion-colony formation | Repression of *PLXNC1* | [109] |
| 577 | TPC-1 BCPAPK1 |  | 35 PTC |  | Inhibition of:- proliferation- migration- invasion | Repression of *SphK2* | [110] |
| 29a-3p | K1TPC-1 |  | 98 PTC | - metastasis | Inhibition of:- cell growth- proliferation- invasion | Targeting of *OTUB2*Suppression of OTUB2/TRAF6/NF-κB | [111] |
| 101 | TPC-1HTH83 293T |  | 16 PTC | - LNM | Inhibition of:- migration- invasion | Repression of *Rac1* | [112] |
| 195 | K1TPC-1 | BALB/c nude mice | 38 PTC |  | Inhibition of:- proliferation- migration - invasion- tumor growth *in vivo* | Targeting *CCND1* and *FGF2*Suppression of Wnt/β-catenin and MMP 13 | [113] |
| 329 | TPC-1BCPAP | BALB⁄c nude mice | 20 PTC |  | Inhibition of:- proliferation- migration - invasion- tumor growth *in vivo* | Repression of *WNT1* | [114] |
| 4728 | TPC-1K1 |  | 18 PTC |  | Inhibition of:- proliferation | Repression of *SOS1*🡪 MAPK signaling pathway | [115] |
| 199a-5p | TPC-1K1 | Male BALB/c nude mice | 24 PTC |  | Inhibition of:- migration - invasion- EMT- tumor growth *in vivo* | Repression of *SNAI1* | [116] |
| 758-3p | TPC-1 BCPAP |  |  |  | Inhibition of:- proliferation- migration Induction of apoptosis | Repression of *TAB1* | [117] |
| 219-5p | K1W3 |  | 30 PTC | - sex (lower at female)- tumor size- LNM- extrathyroidal invasion | Inhibition of:- proliferation - migrationPromotion of: - apoptosis | Repression of *ERα* | [118] |
| 206 | TPC-1TPC-1/euthyrox |  | 23 PTC | - Decreases the Euthyrox-resistance | Inhibition of:- proliferation Induction of:- apoptosis in euthyrox-resistant PTC cells | Targeting *MAP4K3*Inhibition of *p38* and *JNK* signaling pathway | [119] |
| 128 | FTC-133FTC-236 TPC-1CAL-62 FROAROK1 | BALB/c nude mice | 24 PTC6 FTC (follicular) |  | Inhibition of:- proliferation- metastasisInduction of:- apoptosis- cell cycle arrest in G0/G1 phase | Repression of *SPHK1* | [120] |