# Tables

Table S1: The studies of SNHG1 role in solid tumors. T=tumor tissue , C=cells, X=no mention.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type of cancer | Biological role | Molecular mechanism | Cells | Tissue | Ref. |
| Colorectal cancer | Cell growth, apoptosis, invasion, migration | Up-regulation of BCL-2  Down-regulation of BAX, BID, BIM, MMP7, Cyclin D, TCGF7  Activation of WNT pathway | C | x | (Qi et al., 2017) |
| Colorectal cancer | Cell proliferation and viability, cell cycle progression | Down-regulation of p53, p21 and BAX | C | x | (Zhao et al., 2018c) |
| Colorectal cancer | Tumor growth, cell proliferation | miR-145 sponging  Up-regulation of p70S6K and E2F3 | C | x | (Tian et al., 2018) |
| Esophageal cancer | Cell proliferation, invasion capacity and EMT | Down-regulation of HES-, Notch1, Vimentin and N-cadherin  Up-regulation of E-cadherin | C | T | (Zhang et al., 2017) |
| Esophageal cancer | N/A | miR-338 sponging,  Up-regulation of CST3 | C | x | (Yan et al., 2017b) |
| Glioma | Prognosis, cell proliferation, invasion, and apoptosis | N/A | C | x | (Wang et al., 2017e) |
| Hepatocellular carcinoma | Cell proliferation, invasion, and migration | Sponging of miR-195 | C | T | (Zhang et al., 2016b) |
| Hepatocellular carcinoma | Larger tumor size, poor differentiation, cell proliferation, cell cycle progression, apoptosis | Inhibition of p53 | C | T | (Zhang et al., 2016d) |
| Up-regulation of BAX, FAS, and CDKN1A | C | T |
| Laryngeal squamous cell carcinoma | Cell proliferation, invasion and migration | Up-regulation of BCL-2, SNAIL, VIM, MMP2, MMP9  Down-regulation of E-CAD, BAX | C | T | (Lin et al., 2018) |
| Lung cancer | Cell proliferation | N/A | C | x | (You et al., 2014) |
| Lung cancer | Cell proliferation | miR-101 sponging | C | T | (Cui et al., 2017) |
| SOX9 up-regulation | C | T |
| Wnt/β-catenin signaling pathway activation | C | T |
| Lung cancer | Cell viability, proliferation, migration, and invasion | miR-145 sponging  Up-regulation of MTDH | C | x | (Lu et al., 2018a) |
| Nasopharyngeal carcinoma cell | Invasion and migration | miR-145a sponging  Up-regulation of NUAK1 | C | T | (Lan and Liu, 2019) |
| Neuroblastoma | Increased cell viability | miR-15b sponging  Up-regulation of SIAH1 | C | x | (Chen et al., 2018) |
| Osteosarcoma | Cell proliferation, cell migration and EMT | miR-577 sponging | C | x | (Jiang et al., 2018c) |
| WNT2B/Wnt/β-catenin pathway activation | C | x |
| Osteosarcoma | Cell proliferation, apoptosis, tumor growth, migration and invasion | miR-326 sponging | C | T | (Wang et al., 2018a) |
| Up-regulation of NOB1 | C | T |
| Ovarian carcinoma | Cell proliferation, self-renewal capacity, apoptosis, invasion and metastasis | Up-regulation of N-CAD, VIM, MMP-2, MMP-9  Down-regulation of E-CAD | C | T | (Ge et al., 2018) |
| Prostate cancer | Cell proliferation | miR-199a sponging | C | T | (Li et al., 2017) |
| Up-regulation of CDK7 | C | T |

**Table S2:** The studies of SNHG3 role in solid tumors, T=tumor tissue , C=cells, X=no mention

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type of cancer | Biological role | Molecular mechanism | Cells | Tissue | Ref. |
| Breast cancer | Malignant development | Higher SNHG3 level in ER/PR negative tumors | C | T | (Taherian-Esfahani et al., 2019) |
| Colorectal cancer | Cell proliferation | miR-182 sponging  Up-regulation of c-Myc, CCNB1, CCND2, CDK4, and E2F1 | C | x | (Huang et al., 2017) |
| Glioma | Malignant progression | Epigenetic silencing of KLF2 and p21 | C | T | (Fei et al., 2018) |
| Hepatocellular carcinoma | Tumor size, tumor relapse | N/A | C | T | (Zhang et al., 2016e) |
| Hepatocellular carcinoma | Drug resistance | miR-128 sponging  Up-regulation of CD151 | C | x | (Zhang et al., 2019f) |
| Laryngeal carcinoma | Cell proliferation and migration | miR-384 sponging  Up-regulation of WEE1 | C | T | (Wang et al., 2019e) |
| Lung cancer | Cell proliferation | N/A | C | x | (Liu et al., 2018a) |
| Osteosarcoma | Cell growth | miR-196a-5p sponging | C | x | (Chen et al., 2019b) |
| Osteosarcoma | Cell invasion and migration | miR-151a-3p sponging  Up-regulation of RAB22A | C | T | (Zheng et al., 2019) |
| Ovarian cancer | Malignant progression | N/A | C | x | (Hong et al., 2018) |
| Ovarian cancer | Energy metabolism | miR-186a sponging  Up-regulation of PDHB, PKM, IDH2, UQCRH | C | x | (Li et al., 2018b) |

**Table S3:** The studies of SNHG5 role in solid tumors. T=tumor tissue , C=cells, X=no mention

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type of cancer | Biological role | Molecular mechanism | Cells | Tissue | Ref. |
| Acute myeloid leukemia | Possible biomarker | N/A | C | x | (Li and Sun, 2018) |
| Bladder cancer | Cell proliferation, cell cycle progression, apoptosis | p27 down-regulation | C | T | (Ma et al., 2018) |
| Breast cancer | Cell proliferation | miR-154-5p sponging  Up-regulation of PCNA | C | x | (Chi et al., 2019a) |
| Chronic myeloid leukemia | Chemoresistance | miR-205-5p sponging  Up-regulation of ABCC2 | C | x | (He et al., 2017) |
| Colorectal cancer | Cell cycle progression, apoptosis | Increased stability of SPATS2 mRNA | C | x | (Damas et al., 2016) |
| Colorectal cancer | Cell proliferation, metastasis | miR-132-3p sponging  Up-regulation of CREB5 | C | T | (Zhang et al., 2019e) |
| Gastric cancer | Apoptosis, drug resistance | Up-regulation of BCL-2  Down-regulation of BAX | C | x | (Li et al., 2019d) |
| Gastric cancer | Autophagy | METase mediated overexpression of SNHG5  miR-20a sponging  Up-regulation of ATG7 | C | T | (Xin et al., 2019) |
| Gastric cancer | Cell proliferation and migration | miR-32 sponging | C | x | (Zhao et al., 2017) |
| Gastric cancer | Cell proliferation and migration | Up-regulation of KLF4 | C | x |
| Glioma | Cell cycle progression | miR-205 sponging  Up-regulation of E2F3 | C | x | (Li et al., 2019g) |
| Glioma | Cell proliferation, invasion and tumorigenesis | Wnt/CTNNB1 pathway activation | C | x | (Hu et al., 2019) |
| Hepatocellular carcinoma | Cell cycle progression, apoptosis, invasion | miR-26a-5p sponging  Up-regulation of GSK3B, MMP-2, MMP-9, BCL-2, CDK4, CDK6  Down-regulation of BAX | C | x | (Li et al., 2018c) |
| Lung cancer | Drug resistance | miR-377 sponging  Up-regulation of: CASP1 | C | x | (Wang et al., 2018c) |
| Melanoma | Cell growth | miR-26a-5p sponging  Up-regulation of TRPC3 | C | T | (Gao et al., 2019a) |
| Osteosarcoma | Apoptosis | miR-212-3p sponging  Up-regulation of SGK3, Casp-3, Caps-9, PARP | C | x | (Ju et al., 2018) |
| Osteosarcoma | Tumorigenesis | miR-26a sponging  Up-regulation of ROCK1, MLC and MYPT | C | x | (Wang et al., 2018d) |
| Ovarian cancer | Cell proliferation, metastasis | N/A | C | x | (Zhao and Fan, 2019) |

**Table S4:** The studies of SNHG6 role in solid tumors. T=tumor tissue , C=cells, X=no mention T=tumor tissue and C=cells

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type of cancer | Biological role | Molecular mechanism | Cells | Tissue | Ref. |
| Bladder cancer | EMT | miR-125b sponging  Up-regulation of SNAIL1/2, NUAK1 | C | x | (Wang et al., 2019b) |
| Breast cancer | Cell proliferation | N/A | C | T | (Jafari-Oliayi and Asadi, 2019) |
| Breast cancer | Cell proliferation | miR-26a sponging  Up-regulation of VASP | C | T | (Li et al., 2019b) |
| Breast cancer | Cell proliferation, migration and invasion | miR-26a-5p sponging  Up-regulation of:MAPK6 | C | T | (Lv et al., 2019) |
| Breast cancer/lung cancer | Possible biomarker | N/A | x | x | (Ding et al., 2017) |
| Colorectal cancer | Malignant progression, cell invasion | miR-181a-5p sponging  Up-regulation of E2F5, N-CAD, VIM  Down-regulation of E-CAD | C | T | (Yu et al., 2019a) |
| Colorectal cancer | Cell migration and invasion | miR-26a sponging  Up-regulation of EZH2, N-CAD, VIM, SNAIL  Down-regulation of E-CAD | C | T | (Zhang et al., 2019d) |
| Colorectal cancer | Cell proliferation, cell cycle progression | miR-26a/b and miR-214 sponging  Up-regulation of: Cyclin D, CDK4, CDK6, EZH2  Down-regulation of: p14, p15, p16, E-CAD | C | x | (Xu et al., 2019c) |
| Colorectal cancer | Cell proliferation | miR-760 sponging  Up-regulation of FOXC1 | C | T | (Zhu et al., 2018c) |
| Colorectal cancer | Cell proliferation and invasion | miR-101-3p sponging  Down-regulation of UPF1, E-CAD  Up-regulation of ZEB1, N-CAD, VIM, SNAIL, SLUG, MMP2, MMP9  Activation of SMAD2 and SMAD3, with no effect on their expression level | C | T | (Wang et al., 2019i) |
| Colorectal cancer | Cell proliferation and metastasis | Inhibition of AKT, PI3K  mTOR activation (no effect on their protein level)  Up-regulation of ETS1 | C | T | (Meng et al., 2019) |
| Colorectal cancer | Cell proliferation, cell cycle progression and apoptosis | N/A | C | T | (Li et al., 2018a) |
| Colorectal cancer | N/A | Up-regulation of EZH2  Inhibition of p21 transcription through epigenetic modulation | C | x | (Li et al., 2018f) |
| Colorectal cancer | Possible biomarker | N/A | x | x | (Ansari et al., 2019) |
| Colorectal cancer | Possible biomarker | N/A | x | x | (Xue et al., 2017) |
| Esophageal squamous cell carcinoma | Cell proliferation and apoptosis | N/A | C | T | (Fan et al., 2018) |
| Esophageal squamous cell carcinoma | Cell proliferation, migration and invasion | N/A | C | T | (Zhang et al., 2019g) |
| Gastric cancer | Cell invasion and migration | miR-101 sponging  Down-regulation of : E-CAD, β-catenin, p27  Up-regulation: N-CAD, VIM, ZEB1 | C | T | (Yan et al., 2017a) |
| Gastric cancer | Cell proliferation | Inhibition of JNK, p38, ERK1/2  Down-regulation of p53, p21  Up-regulation of EZH2 | C | x | (Li et al., 2018d) |
| Glioma | Cell proliferation | Down-regulation of: p21  Inhibition of: CASP3, CASP9 | C | T | (Cai et al., 2018) |
| Glioma | Cell proliferation, migration and invasion | miR-101-3p sponging | C | T | (Meng et al., 2018) |
| Hepatocellular carcinoma | Cell cycle progression, apoptosis | miR-101 sponging | C | T | (Chang et al., 2016) |
| Up-regulation of SNORD87, c-Myc, CDK4, CDK6, CCND1, BAX, MMP9, MMP2, VIM, Fibronectin, ZEB1  Down-regulation of E-CAD, Claudin-1  Inhibition of CASP3, PARP | C | T |
| Hepatocellular carcinoma | Cell proliferation | miR-139-5p sponging  Up-regulation of SERPINH1 | C | T | (Wu et al., 2019a) |
| Hepatocellular carcinoma | Methylation | Lower general DNA methylation through inhibition of S-adenosylmethionine  miR-1297 sponging  Down-regulation of MAT1A | C | T | (Guo et al., 2018b) |
| Lung cancer | Cell proliferation and EMT | Up-regulation of N-CAD, VIM, E2F7  Down-regulation of E-CAD, Zo-1  miR-26a-5p sponging | C | x | (Liang et al., 2018) |
| Osteosarcoma | Autophagy | miR-26a sponging  Down-regulation of ULK1  Inhibition of CASP3, ATF3 | C | T | (Zhu et al., 2019b) |
| Osteosarcoma | Cell proliferation | Up-regulation of p21 and KLF2  Down-regulation of CCND2 | C | T | (Ruan et al., 2018) |
| Ovarian cancer | Cell proliferation and migration | miR-4465 sponging  Up-regulation of N-CAD, MMP2, MMP9, EZH2 | C | T | (Wu et al., 2019d) |
| Prostate cancer | N/A | N/A | C | x | (Yan et al., 2019) |
| Renal cancer | Metastasis | N/A | C | T | (An et al., 2018) |
| Urinary system tumor | Cell proliferation, migration and invasion | miR-15a sponging  Down-regulation of p53,  Up-regulation of CCND2  Inhibition of CASP3, CASP9, TAK, JNK | C | x | (Su et al., 2019a) |

**Table S5:** The studies of SNHG7 role in solid tumors. T=tumor tissue , C=cells, X=no mention

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type of cancer | Biological role | Molecular mechanism | Cells | Tissue | Ref. |
| Bladder cancer | Cell proliferation | Indirect increase of BAX, p21 and E-CAD | C | T | (Xu et al., 2019b) |
| Bladder cancer | Cell proliferation and migration | Wnt/B-catenin pathway activating  Up-regulation of β-catenin, CCND2, c-Myc  Down-regulation of E-CAD | C | T | (Chen et al., 2019d) |
| Bladder cancer | Cell proliferation, invasion and apoptosis | Up-regulation of N-CAD, VIM, Snail,  Down-regulation of E-CAD | C | T | (Zhong et al., 2018) |
| Breast cancer | Cell cycle progression, iinvasion and migration | miR-34a sponging  Up-regulation of MMP2, MMP7, VIM, Snail, Notch-1, Survivin, CCND1  Down-regulation of E-CAD | C | T | (Sun et al., 2019c) |
| Breast cancer | Cell proliferation, metastasis | miR-186 sponging | C | T | (Luo et al., 2018) |
| Breast cancer | Cell proliferation and invasion | miR-381 sponging | C | x | (Gao and Zhou, 2019) |
| Colorectal cancer | Cell proliferation | miR-34a sponging  Up-regulation of GALNT1  Activation of PI3K, Akt, mTOR | C | T | (Li et al., 2018e) |
| Colorectal cancer | Cell proliferation and metastasis | Up-regulation of GALNT1  miR-216b sponging | C | T | (Shan et al., 2018) |
| Esophageal cancer | Cell proliferation and apoptosis | Up-regulation of p15 and p16 | C | T | (Xu et al., 2018b) |
| Gastric cancer | Cell proliferation and apoptosis | Inhibition of p15 and p16 | C | T | (Wang et al., 2017b) |
| Gliobastoma | Cell proliferation, migration and invasion | miR-5095 sponging  Wnt/β-catenin signaling pathway activation | C | T | (Ren et al., 2018) |
| Hepatocellular carcinoma | Metastasis | Down-regulation of RBM5 | C | T | (Sun et al., 2019a) |
| Hypopharyngeal cancer | Cell growth | N/A | C | x | (Wu et al., 2019c) |
| Lung cancer | Cell proliferation, apoptosis, invasion and migration | Up-regulationof *FAIM2* | C | x | (She et al., 2016) |
| Lung cancer | Cell proliferation, apoptosis, invasion and migration | miR-193b sponging  Up-regulation of FAIM2 | C | T | (She et al., 2018) |
| Melanoma | Cell migration | Up-regulation of SOX4 | C | T | (Zhang et al., 2019b) |
| Nasopharyngeal carcinoma | Cell proliferation and invasion | Up-regulation of ROCK1 | C | T | (Wang et al., 2019f) |
| Neuroblastoma | Cell cycle progression, invasion, migration | Up-regulation of β-catenin, VIM, N-CAD, STAT2, STAT3  Down-regulation of E-CAD  miR-653 sponging | C | T | (Chi et al., 2019b) |
| Osteosarcoma | Cell growth and EMT | Regulation of miR-34a  Up-regulation of: Notch1, BCL-2, CDK6, SMAD4 | C | T | (Deng et al., 2018) |
| Osteosarcoma | Cell proliferation | Down-regulation of:p53 via binding DNMT1 | C | T | (Zhang et al., 2019c) |
| Pancreatic cancer | Cell proliferation | miR-342-3p sponging  Up-regulation of ID4 | C | T | (Cheng et al., 2019) |
| Prostate cancer | Cell proliferation, cell growth, angiogenesis | miR-503 sponging  Up-regulation of: Cyclin D1, CDK4, CDK6 | C | T | (Qi et al., 2018) |
| Prostate cancer | EMT | Up-regulation of N-CAD, WNT2B  Down-regulation of E-CAD  miR-324 sponging | C | T | (Han et al., 2019b) |
| Renal cancer | N/A | N/A | C | T | (He et al., 2016) |
| Thyroid cancer | Cell proliferation and apoptosis | Up-regulating of BDNF | C | T | (Wang et al., 2019k) |

**Table S6:** The studies of SNHG12 role in solid tumors. T=tumor tissue , C=cells, X=no mention

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type of cancer | Biological role | Molecular mechanism | Cells | Tumor tissue | Ref. |
| Natural killer/T-cell lymphoma | Cell proliferation and drug resistance | Its transcription is up-regulated by c-Myc activity | C | x | (Zhu et al., 2019a) |
| Bladder cancer | Cell proliferation | Up-regulation of HDAC10, AGER  Down-regulation of PCDH7, LATS2 | C | x | (Jiang et al., 2018a) |
| Breast cancer | Cell proliferation, apoptosis and migration | Up-regulation of MMP13  Its transcription is up-regulated by c-Myc activity | C | T | (Wang et al., 2017c) |
| Cervical cancer | Cell proliferation, migration and invasion | miR-424-5p sponging | C | T | (Dong et al., 2018a) |
| Cervical cancer | Cell proliferation, migration and invasion | miR-125b sponging  Up-regulation of STAT3 | C | x | (Jin et al., 2019) |
| Colorectal cancer | Cell proliferation and invasion | miR-16 sponging | C | T | (Liu et al., 2019f) |
| Colorectal cancer | Proliferation, cell cycle arrest, apoptosis | Up-regulation of CDK4, CDK6 and CCND1  Inhibition of CASP3  Activation of AKT | C | x | (Wang et al., 2017a) |
| Gastric cancer | Cell proliferation and metastasis | miR-199a/b-5p sponging | C | x | (Yang et al., 2018a) |
| Gastric cancer | Cell proliferation and migration | miR-16 sponging | C | x | (Zhao et al., 2019) |
| Gastric cancer | Larger tumor size, tumor node metastasis stage, distant metastasis, lymphatic metastasis, cell growth, colony formation, proliferation and invasion | miR-320 sponging  Up-regulation of: CRLK  Activation of AKT, ERK | C | x | (Zhang and Lu, 2018) |
| Glioma | Cell growth | miR-101-2 sponging  Up-regulation of: FOXP1 | C | x | (Sun et al., 2018b) |
| Glioma | Cell proliferation and migration | Associated with Hu antigen R (HuR) | C | x | (Lei et al., 2018) |
| Glioma | Malignant progression | TDP43 stabilizes SNHG12  miR-195-sponging  Up-regulation of SOX5 | C | T | (Liu et al., 2018b) |
| Laryngeal squamous cell carcinoma | Cell proliferation, invasion and apoptosis | miR-129-5p sponging  Up-regulation of WWP1 (WT) | C | x | (Li et al., 2019a) |
| Lung cancer | Cell proliferation, migration and invasion | miR-218 sponging  Inhibition of CASP3, CASP9  Up-regulation of MMP9, VIM, SLUG, ZEB2  Down-regulation of E-CAD | C | x | (Wang et al., 2019j) |
| Lung cancer | Cell proliferation, self-renewal capacity. apoptosis, drug resistance | miR-138 sponging | C | x | (Wang et al., 2017f) |
| Lung cancer | Cell proliferation, self-renewal capacity. apoptosis, drug resistance | miR-181a sponging  Up-regulation of SLUG  Activation of MAPK1, MAP2K1 | C | x | (Wang et al., 2017d) |
| Lung cancer | Receptor-mediated endocytosis,  macropinocytosis, and phagocytosis | N/A | x | T | (Lei et al., 2019) |
| Nasopharyngeal carcinoma | Cell proliferation, migration and invasion | Up-regulation of N-CAD, VIM, NOTCH1, P21, HES1  Down-regulation of E-CAD | C | x | (Liu et al., 2018c) |
| Osteosarcoma | Cell proliferation, migration, and angiogenesis | Up-regulation of AMOT | C | x | (Ruan et al., 2016) |
| Osteosarcoma | Drug resistance | miR-320a sponging  Up-regulation of MCL1 | C | x | (Zhou et al., 2018a) |
| Osteosarcoma | Tumorigenesis and metastasis | Up-regulation of CDK4, CDK6, CCND1, NOTCH-2  miR195-5p sponging | C | x | (Zhou et al., 2018b) |
| Ovarian carcinoma | Cell proliferation and migration | miRNA-129 sponging  Up-regulation of SOX4 | C | x | (Sun and Fan, 2019) |
| Papillary thyroid carcinoma | Cell growth and invasion | miR-16-5p sponging  Up-regulation of MMP13, MMP9, BCL-2, PCNA  Down-regulation of BAX | C | x | (Feng et al., 2019) |
| Papillary thyroid carcinoma | Cell proliferation and migration | Up-regulation of β-catenin, CCND1, MMP2 | C | x | (Ding et al., 2018) |
| Prostate cancer | Cell proliferation, invasion and migration | miRNA-195 sponging  Wnt/b-catenin signaling pathway activation | C | x | (Song et al., 2019) |
| Prostate cancer | Tumorigenesis, cell growth, migration, and invasion | miR-133b sponging | C | x | (Cheng et al., 2020) |
| Renal cell carcinoma | Cell viability, migration, tumor growth | miR-199a-5p sponging  Up-regulation of HIF1α  Repression of PARP cleavage | C | x | (Chen et al., 2019c) |

**Table S7:** The studies of SNHG15 role in solid tumors. T=tumor tissue , C=cells, X=no mention

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type of cancer | Biological role | Molecular mechanism | Cells | Tissue | Ref. |
| Breast cancer | Cell proliferation, migration and invasion | miR-211-3p sponging  Up-regulation of PCNA, CCND1, VIM, MMP2, MMP9, SNAI1  Down-regulation of BAX, E-CAD  Inhibition of CASP3 cleavage | C | x | (Kong and Qiu, 2018) |
| Colon cancer | Cell proliferation | Impairs β-transducin repeat containing (BTRC)- mediated ubiquitination of SLUG | C | x | (Jiang et al., 2018b) |
| Colorectal cancer | Cell proliferation | Down-regulation of BAX, E-CAD, WNT1, c-MYC, Cyclin D, β-catenin  Up-regulation of N-CAD, VIM, SNAIL  Inhibition of CASP3, CASP9  miR-141 sponging | C | T | (Sun et al., 2019b) |
| Colorectal cancer | Cell proliferation | miR-338-3p sponging  Up-regulation of: FOS, RAB14 | C | T | (Li et al., 2019c) |
| Colorectal cancer | Cell proliferation, invasion and drug resistance | Interaction with AIF (Apoptosis-inducing factor) | C | x | (Saeinasab et al., 2019) |
| Colorectal cancer | Migration | Interaction with β-transducin repeat containing (BTRC) E3, which suppresses ubiquitination of SLUG protein | C | x | (Jiang et al., 2018b) |
| Colorectal cancer (CRC) and colorectal liver metastasis (CLM) | Initiation and progression of CRC and CLM | N/A | C | x | (Huang et al., 2019) |
| Gastric cancer | Cell proliferation and invasion | Up-regulation of MMP2, MMP9 | C | T | (Chen et al., 2016) |
| Glioblastoma | Angiogenesis | miR-153 sponging  Up-regulation of VEGFA, Cdc42 | C | x | (Ma et al., 2017a) |
| Hepatocellular carcinoma | Cell proliferation, migration and invasion | miR-141-3p sponging  Up-regulation of ZEB2 and E2F3 | C | T | (Ye et al., 2019a) |
| Hepatocellular carcinoma | Cell invasion and migration | N/A | x | T | (Zhang et al., 2016c) |
| Lung cancer | Cell proliferation | miR-211-3p sponging  Up-regulation of ZNF217 | C | x | (Ma et al., 2019) |
| Lung cancer | Cell proliferation and metastasis | miR-486 sponging  Up-regulation of CDK14 | C | T | (Jin et al., 2018) |
| Lung cancer | Cell proliferation and invasion | N/A | C | T | (Dong et al., 2018b) |
| Lung cancer | Cell proliferation and migration | miR-211-3p sponging | C | T | (Cui et al., 2018) |
| Osteosarcoma | Cell proliferation, migration, and drug resistance | miR-141 sponging  Up-regulation of ZEB2 and E2F3 | C | x | (Liu et al., 2017c) |
| Ovarian cancer | Cell proliferation, migration, invasion, drug resistance | N/A | C | x | (Qu et al., 2019) |
| Pancreatic cancer | Cell proliferation and apoptosis | Inhibition of: CASP3, PARP  Up-regulation of:CDK2, CDK4  Down-regulation of: P15 and KLF2 | C | T | (Ma et al., 2017b) |
| Pancreatic cancer | Malignant progression | N/A | x | T | (Guo et al., 2018c) |
| Prostate cancer | Malignant progression | miR-338-3p sponging  Up-regulation of N-CAD, FKBP1A  Down-regulation of E-CAD | C | x | (Zhang et al., 2019h) |
| Renal cell carcinoma | Cell proliferation and EMT | Up-regulation of N-CAD, VIM, SNAIL, SLUG, ZEB1  Down-regulation of E-CAD | C | T | (Du et al., 2018) |
| Thyroid cancer | Cell growth and migration | miR-200a-3p sponging  Up-regulation of E-CAD, β-catenin, YAP1  Down-regulation of VIM, N-CAD, MST1, LATS1 | C | T | (Wu et al., 2018) |
| Thyroid cancer | Cell proliferation, migration and invasion | miR-510-5p sponging | C | T | (Liu et al., 2019e) |
| Thyroid cancer | Tumor suppressor | N/A | C | x | (Liu et al., 2019d) |

**Table S8:** The studies of SNHG16 role in solid tumors. T=tumor tissue , C=cells, X=no mention

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type of cancer | Biological role | Molecular mechanism | Cells | Tissue | Ref. |
| Acute lymphoblastic leukemia | Tumor suppressor | miR-124-3p sponging | C | x | (Yang et al., 2019) |
| Bladder cancer | Cell cycle progression, apoptosis | It interacts witch EZH2 and causes methylation of p21 gene | C | T | (Cao et al., 2018) |
| Bladder cancer | Cell proliferation | miR-98 sponging  Up-regulation of BCL2, VIM, N-CAD and SNAIL, c‐Myc, CCND1, andβ‐catenin  Down-regulation of BAX, p27Kip  Inhibition of CASP3, CASP9 | C | T | (Feng et al., 2018) |
| Bladder cancer | EMT | miR-17-5p sponging  Up-regulation of BCL-2, TIMP3  Down-regulation of BAX, CASP3 | C | T | (Peng and Li, 2019) |
| Breast cancer | Cell proliferation and apoptosis | miR-98 sponging  Up-regulation of E2F5 | C | T | (Cai et al., 2017) |
| Cervical | Cell proliferation, apoptosis and migration | miR-216 sponging  Up-regulation of ZEB1 | C | T | (Zhu et al., 2018b) |
| Colorectal cancer | Cell proliferation | miR-200a-3p sponging  Up-regulation of VIM, α-SMA, beta catenin  Down-regulation of E-CAD | C | T | (Li et al., 2019j) |
| Esophageal squamous cell carcinoma | Cell proliferation | Up-regulation of beta-catenin, CCND1, c-MYC | C | T | (Han et al., 2018) |
| Esophagus | Cell viability, apoptosis, migration | miR-140 sponging  Up-regulation of ZEB1 | T |  | (Zhang et al., 2018b) |
| Gastric cancer | Cell proliferation | miR-628-3p sponging  Up-regulation of NRP1 | C | x | (Pang et al., 2019) |
| Gastric cancer | Cell proliferation | miR-135a sponging  Activation of JAK, STAT3 | C | T | (Wang et al., 2019h) |
| Gastric cancer | Cell proliferation, growth, invasion and migration | N/A | C | T | (Lian et al., 2017) |
| Glioma | Apoptosis | miR-4518 sponging  Up-regulation of BCL-2, BC:-xL, MCL-1, PRMT5  Down-regulation of BAX  Activation of AKT, PI3K,  Inhibition of CASP3 | C | x | (Lu et al., 2018b) |
| Glioma | Cell proliferation, increased tumor volume | miR-20a-5p sponging  Up-regulation of E3F1 | C | T | (Yang et al., 2018b) |
| Glioma | Cell proliferation | Down-regulation of CASP3, CASP9, p21  Up-regulation of CCND1, CCNB1 | C | T | (Zhou et al., 2019a) |
| Glioma | Cell proliferation | USF1 up-regulates SNHG16  miR-212-3p sponging  Up-regulation of EphA2, VE-CAD, ALDH1A1 | C | T | (Wang et al., 2019d) |
| Glioma | Malignant progression | miR-373 sponging  Up-regulation of: MMP2, MMP9  Activation of: PI3K, AKT, EGFR | C | x | (Zhou et al., 2019b) |
| Hemangioma | Cell proliferation | miR-520d-3p sponging  Inhibition of CASP3, CASP9  Up-regulation of STAT3 | C | T | (Zhao et al., 2018b) |
| Hepatocellular carcinoma | Cell proliferation | miR-302a-3p sponging  Up-regulation of FGF19 | C | x | (Li et al., 2019f) |
| Hepatocellular carcinoma | Cell proliferation and invasion | miR-186 sponging  Up-regulation of ROCK1 | C | T | (Chen et al., 2019a) |
| Hepatocellular carcinoma | Cell proliferation, invasion and tumorigenesis | miR-195 sponging  Up-regulation of Ki67, MMP2, MMP9 | C | T | (Xie et al., 2019) |
| Hepatocellular carcinoma | Cell proliferation, invasion and tumorigenesis | Up-regulation of p62, mTOR  Activation of p70S6, mTOR, NF-kB | C | x | (Zhong et al., 2020) |
| Hepatocellular carcinoma | Drug resistance | N/A | C | T | (Guo et al., 2019b) |
| Hepatocellular carcinoma | Drug resistance | miR-140-5p sponging | C | T | (Ye et al., 2019b) |
| Hepatocellular carcinoma | Tumorigenesis | miR-4500 sponging  Activation of STAT3  Up-regulation of N-CAD  Down-regulation of E-CAD | C | T | (Lin et al., 2019) |
| Hepatocellular carcinoma | Cell proliferation and drug resistance | miR-93 sponging | C | T | (Xu et al., 2018a) |
| Lung cancer | Cell proliferation and migration | miR-146a sponging  Up-regulation of PNCA, MMP2, MMP9 | C | x | (Han et al., 2019a) |
| Neuroblastoma | Cell proliferation, cell cycle progression | N/A | C | x | (Yu et al., 2019c) |
| Oral carcinoma | Cell proliferation | c-Myc induced up-regulation of SNHG16  Up-regulation of PNCA, MMP2, MMP9, N-CAD, SNAIL,  Down-regulation of E-CAD  Inhibition of CASP3 | C | T | (Li et al., 2019e) |
| Osteosarcoma | Cell migration and invasion | miR-340 sponging | C | T | (Su et al., 2019b) |
| Osteosarcoma | Cell proliferation | miR-205 sponging  Inactivation of CASP3, PARP  Up-regulation of ZEB1 | C | T | (Zhu et al., 2018a) |
| Osteosarcoma | Cell proliferation, migration and invasion | miR-1301 sponging  Up-regulation of BCL9 | C | x | (Wang et al., 2019g) |
| Osteosarcoma | Cell survival and proliferation | miR-98-5p sponging  Up-regulation of STAT3, ZEB1, E2F5 | C | T | (Liao et al., 2019) |
| Osteosarcoma | Drug resistance | miR-16 sponging  Up-regulation of ATG4B | C | T | (Liu et al., 2019c) |
| Ovarian | Cell migration | Up-regulation of MMP9 | C | T | (Yang et al., 2018c) |
| Pancreatic cancer | Tumor growth | miR-218-5p sponging  Up-regulation of HMGB1 | C | T | (Liu et al., 2019b) |
| Retinoblastoma | Cell proliferation | miR-140-5p sponging | C | T | (Xu et al., 2019a) |
| Thyroid cancer | Cell proliferation and invasion | miR-497 sponging  Up-regulation of BDNF, YAP | C | T | (Wen et al., 2019) |

**Table S9:** The studies of SNHG20 role in solid tumors. T=tumor tissue , C=cells, X=no mention

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type of cancer | Biological role | Molecular mechanism | Cells | Tissue | Ref. |
| Breast cancer | Cell proliferation, invasion and migration | miR-495 sponging  Up-regulation of MMP2, MMP9  Activation of beta-catenin, c-MYC | C | x | (Zhao et al., 2018a) |
| Cervical cancer | Cell proliferation and invasion | miR-140-5p sponging  Up-regulation of ADAM10, which further activates p38, ERK, MEK | C | x | (Guo et al., 2018a) |
| Colorectal cancer | Cell proliferation, migration and apoptosis | Down-regulation of p21  Up-regulation of cyclin A1 | C | x | (Li et al., 2016) |
| Esophageal squamous cell carcinoma | Cell growth and metastasis | Up-regulation of N-CAD, VIM, ZEB1  Down-regulation of E-CAD  Activation of ATM, JAK, PD-L1 | C | x | (Zhang et al., 2019a) |
| Gastric cancer | Cell proliferation and invasion | miR-495-3p sponging  Up-regulation of ZFX | C | x | (Cui et al., 2019) |
| Gastric cancer | Cell proliferation, invasion, migration, and cell cycle progression | Direct binding to the EZH2 at protein level  Up-regulation of TWIST1, VIM, β-catenin, GSK-3β  Down-regulation of E-CAD, p21 | C | x | (Liu et al., 2017a) |
| Gastric cancer | Drug resistance | miR140-5p sponging  Up-regulation of NDRG3 | C | x | (Yu et al., 2019b) |
| Glioblastoma | Tumorigenesis and cancer stemness | Up-regulation of CD44, CD133 and Oct-4  Activation of PI3K, AKT and mTOR  Inhibition of CASP3, CASP9 | C | x | (Gao et al., 2019c) |
| Glioma | Cell proliferation | Down-regulation of p21  Up-regulation of CCNA1 | C | T | (Li et al., 2019i) |
| Glioma | Angiogenesis | ZRANB2 stabilizes SNHG20  It mediates FOXK1 degradation through Staufen1 (STAU1)-mediated mRNA decay (SMD)  Up-regulation of MMP1, MMP9, VE-CAD | C | x | (Li et al., 2019h) |
| Glioma | Cell proliferation | miR-4486 sponging  Up-regulation of MDM2, p53 | C | T | (Liu et al., 2019a) |
| Glioma | Cell proliferation and apoptosis | Up-regulation of BCL-2  Down-regulation of BAX, PTEN, PI3K  Inhibition of AKT | C | T | (Guo et al., 2019a) |
| Hepatocellular carcinoma | Cellular proliferation, migration, and invasion | Up-regulation of ZEB1, ZEB2, N-CAD, VIM  Down-regulation of E-CAD | C | x | (Zhang et al., 2016a;Liu et al., 2017b) |
| Hepatocellular carcinoma (From fatty liver disease) | Malignant progression | Activation of STAT6 | C | x | (Wang et al., 2019a) |
| Laryngeal squamous cell carcinoma | Cell proliferation | miR-140 sponging | C | T | (Li et al., 2019k) |
| Lung cancer | Cell proliferation and invasion | Interact with EZH2  Down-regulation of P21 | C | T | (Chen et al., 2017) |
| Lung cancer | Cell proliferation, migration and invasion | miR-154 sponge  Up-regulation of ZEB2 | C | T | (Lingling et al., 2019) |
| Nasopharyngeal carcinoma | Cell migration and invasion | Up-regulation of TGF-B1, MMP2, MMP9 | C | x | (Sun et al., 2018a) |
| Oral cancer | Cell proliferation | Up-regulation of PCNA and Ki67 expression | C | x | (Gao et al., 2019b) |
| Oral cancer | Tumorigenesis | miR-197 sponging  Up-regulation of LIN28, NANOG, OCT4, SOX2 | C | x | (Wu et al., 2019b) |
| Osteosarcoma | Apoptosis | activation of miR-139 sponging  Up-regulation of BCL-2, RUNX  Down-regulation of BAX  Inactivation of CASP3 | C | x | (Wang et al., 2018b) |
| Osteosarcoma | Cell migration and invasion | Up-regulation of ZEB1, ZEB2, VIM  Down-regulation of E-CAD | C | T | (Zhang et al., 2018a) |
| Ovarian cancer | Cell cycle progression and invasion | Up-regulation of CCND1, VIM  Down-regulation of P21, E-CAD | C | T | (Wang et al., 2019c) |
| Ovarian cancer | Cell proliferation and invasion | Up-regulation of β-catenin, CCND1, c-MYC,  Down-regulation of E-CAD  Activation of GSK-3β | C | x | (He et al., 2018) |

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