# 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-2Down-regulation of BAX, BID, BIM, MMP7, Cyclin D, TCGF7Activation 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 spongingUp-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-cadherinUp-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, MMP9Down-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 spongingUp-regulation of MTDH | C | x | (Lu et al., 2018a) |
| Nasopharyngeal carcinoma cell | Invasion and migration | miR-145a spongingUp-regulation of NUAK1 | C | T | (Lan and Liu, 2019) |
| Neuroblastoma | Increased cell viability | miR-15b spongingUp-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-9Down-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 spongingUp-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 spongingUp-regulation of CD151 | C | x | (Zhang et al., 2019f)  |
| Laryngeal carcinoma  | Cell proliferation and migration  | miR-384 spongingUp-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 spongingUp-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 spongingUp-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 spongingUp-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 SNHG5miR-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 spongingUp-regulation of GSK3B, MMP-2, MMP-9, BCL-2, CDK4, CDK6Down-regulation of BAX  | C | x | (Li et al., 2018c) |
| Lung cancer  | Drug resistance  | miR-377 spongingUp-regulation of: CASP1  | C | x | (Wang et al., 2018c) |
| Melanoma | Cell growth | miR-26a-5p spongingUp-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 spongingUp-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 spongingUp-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 spongingUp-regulation of VASP  | C | T | (Li et al., 2019b) |
| Breast cancer | Cell proliferation, migration and invasion  | miR-26a-5p spongingUp-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 spongingUp-regulation of E2F5, N-CAD, VIMDown-regulation of E-CAD  | C | T | (Yu et al., 2019a) |
| Colorectal cancer | Cell migration and invasion  | miR-26a spongingUp-regulation of EZH2, N-CAD, VIM, SNAILDown-regulation of E-CAD  | C | T | (Zhang et al., 2019d) |
| Colorectal cancer | Cell proliferation, cell cycle progression | miR-26a/b and miR-214 spongingUp-regulation of: Cyclin D, CDK4, CDK6, EZH2Down-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 spongingDown-regulation of UPF1, E-CADUp-regulation of ZEB1, N-CAD, VIM, SNAIL, SLUG, MMP2, MMP9Activation 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, PI3KmTOR 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 spongingDown-regulation of : E-CAD, β-catenin, p27Up-regulation: N-CAD, VIM, ZEB1 | C | T | (Yan et al., 2017a) |
| Gastric cancer | Cell proliferation  | Inhibition of JNK, p38, ERK1/2Down-regulation of p53, p21Up-regulation of EZH2 | C | x | (Li et al., 2018d) |
| Glioma | Cell proliferation  | Down-regulation of: p21Inhibition 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, ZEB1Down-regulation of E-CAD, Claudin-1 Inhibition of CASP3, PARP | C | T |
| Hepatocellular carcinoma | Cell proliferation  | miR-139-5p spongingUp-regulation of SERPINH1 | C | T | (Wu et al., 2019a) |
| Hepatocellular carcinoma | Methylation  | Lower general DNA methylation through inhibition of S-adenosylmethioninemiR-1297 spongingDown-regulation of MAT1A  | C | T | (Guo et al., 2018b) |
| Lung cancer | Cell proliferation and EMT  | Up-regulation of N-CAD, VIM, E2F7Down-regulation of E-CAD, Zo-1miR-26a-5p sponging | C | x | (Liang et al., 2018) |
| Osteosarcoma  | Autophagy  | miR-26a spongingDown-regulation of ULK1Inhibition of CASP3, ATF3  | C | T | (Zhu et al., 2019b) |
| Osteosarcoma  | Cell proliferation  | Up-regulation of p21 and KLF2Down-regulation of CCND2 | C | T | (Ruan et al., 2018) |
| Ovarian cancer | Cell proliferation and migration | miR-4465 spongingUp-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 spongingDown-regulation of p53, Up-regulation of CCND2Inhibition 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 activatingUp-regulation of β-catenin, CCND2, c-MycDown-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, CCND1Down-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 spongingUp-regulation of GALNT1Activation 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 spongingWnt/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 spongingUp-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, STAT3Down-regulation of E-CADmiR-653 sponging  | C | T | (Chi et al., 2019b) |
| Osteosarcoma  | Cell growth and EMT | Regulation of miR-34aUp-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 spongingUp-regulation of ID4 | C | T | (Cheng et al., 2019) |
| Prostate cancer | Cell proliferation, cell growth, angiogenesis | miR-503 spongingUp-regulation of: Cyclin D1, CDK4, CDK6 | C | T | (Qi et al., 2018) |
| Prostate cancer | EMT | Up-regulation of N-CAD, WNT2BDown-regulation of E-CADmiR-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, AGERDown-regulation of PCDH7, LATS2 | C | x | (Jiang et al., 2018a) |
| Breast cancer | Cell proliferation, apoptosis and migration | Up-regulation of MMP13Its 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 spongingUp-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 CCND1Inhibition of CASP3Activation 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 spongingUp-regulation of: CRLKActivation of AKT, ERK | C | x | (Zhang and Lu, 2018) |
| Glioma | Cell growth  | miR-101-2 spongingUp-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 SNHG12miR-195-spongingUp-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 spongingInhibition of CASP3, CASP9Up-regulation of MMP9, VIM, SLUG, ZEB2Down-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 spongingUp-regulation of SLUGActivation 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, HES1Down-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-2miR195-5p sponging | C | x | (Zhou et al., 2018b) |
| Ovarian carcinoma | Cell proliferation and migration | miRNA-129 spongingUp-regulation of SOX4 | C | x | (Sun and Fan, 2019) |
| Papillary thyroid carcinoma | Cell growth and invasion  | miR-16-5p spongingUp-regulation of MMP13, MMP9, BCL-2, PCNADown-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 spongingWnt/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 spongingUp-regulation of HIF1αRepression 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, SNAI1Down-regulation of BAX, E-CADInhibition 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-cateninUp-regulation of N-CAD, VIM, SNAILInhibition of CASP3, CASP9miR-141 sponging  | C | T | (Sun et al., 2019b) |
| Colorectal cancer | Cell proliferation  | miR-338-3p spongingUp-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 spongingUp-regulation of VEGFA, Cdc42 | C | x | (Ma et al., 2017a) |
| Hepatocellular carcinoma | Cell proliferation, migration and invasion  | miR-141-3p spongingUp-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 spongingUp-regulation of ZNF217 | C | x | (Ma et al., 2019) |
| Lung cancer | Cell proliferation and metastasis | miR-486 spongingUp-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, PARPUp-regulation of:CDK2, CDK4Down-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 spongingUp-regulation of N-CAD, FKBP1ADown-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, ZEB1Down-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 spongingUp-regulation of BCL2, VIM, N-CAD and SNAIL, c‐Myc, CCND1, andβ‐cateninDown-regulation of BAX, p27KipInhibition of CASP3, CASP9 | C | T | (Feng et al., 2018) |
| Bladder cancer | EMT | miR-17-5p sponging Up-regulation of BCL-2, TIMP3Down-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 spongingUp-regulation of ZEB1 | C | T | (Zhu et al., 2018b) |
| Colorectal cancer | Cell proliferation | miR-200a-3p sponging Up-regulation of VIM, α-SMA, beta cateninDown-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 spongingUp-regulation of ZEB1  | T |   | (Zhang et al., 2018b) |
| Gastric cancer | Cell proliferation  | miR-628-3p spongingUp-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, PRMT5Down-regulation of BAXActivation of AKT, PI3K, Inhibition of CASP3 | C | x | (Lu et al., 2018b) |
| Glioma | Cell proliferation, increased tumor volume  | miR-20a-5p spongingUp-regulation of E3F1 | C | T | (Yang et al., 2018b) |
| Glioma | Cell proliferation  | Down-regulation of CASP3, CASP9, p21Up-regulation of CCND1, CCNB1  | C | T | (Zhou et al., 2019a) |
| Glioma | Cell proliferation  | USF1 up-regulates SNHG16miR-212-3p sponging Up-regulation of EphA2, VE-CAD, ALDH1A1 | C | T | (Wang et al., 2019d) |
| Glioma | Malignant progression | miR-373 spongingUp-regulation of: MMP2, MMP9Activation of: PI3K, AKT, EGFR | C | x | (Zhou et al., 2019b) |
| Hemangioma  | Cell proliferation  | miR-520d-3p spongingInhibition of CASP3, CASP9Up-regulation of STAT3 | C | T | (Zhao et al., 2018b) |
| Hepatocellular carcinoma | Cell proliferation  | miR-302a-3p spongingUp-regulation of FGF19  | C | x | (Li et al., 2019f) |
| Hepatocellular carcinoma | Cell proliferation and invasion  | miR-186 spongingUp-regulation of ROCK1 | C | T | (Chen et al., 2019a) |
| Hepatocellular carcinoma | Cell proliferation, invasion and tumorigenesis  |  miR-195 spongingUp-regulation of Ki67, MMP2, MMP9 | C | T | (Xie et al., 2019) |
| Hepatocellular carcinoma | Cell proliferation, invasion and tumorigenesis  | Up-regulation of p62, mTORActivation 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-CADDown-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 spongingUp-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 SNHG16Up-regulation of PNCA, MMP2, MMP9, N-CAD, SNAIL, Down-regulation of E-CADInhibition 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, PARPUp-regulation of ZEB1 | C | T | (Zhu et al., 2018a)  |
| Osteosarcoma  | Cell proliferation, migration and invasion  | miR-1301 spongingUp-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 spongingUp-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 spongingUp-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 spongingUp-regulation of MMP2, MMP9Activation 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, ZEB1Down-regulation of E-CADActivation 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 levelUp-regulation of TWIST1, VIM, β-catenin, GSK-3βDown-regulation of E-CAD, p21 | C | x | (Liu et al., 2017a) |
| Gastric cancer | Drug resistance | miR140-5p spongingUp-regulation of NDRG3  | C | x | (Yu et al., 2019b) |
| Glioblastoma | Tumorigenesis and cancer stemness | Up-regulation of CD44, CD133 and Oct-4Activation of PI3K, AKT and mTORInhibition of CASP3, CASP9 | C | x | (Gao et al., 2019c) |
| Glioma | Cell proliferation | Down-regulation of p21Up-regulation of CCNA1 | C | T | (Li et al., 2019i) |
| Glioma | Angiogenesis | ZRANB2 stabilizes SNHG20It 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-2Down-regulation of BAX, PTEN, PI3KInhibition of AKT  | C | T | (Guo et al., 2019a) |
| Hepatocellular carcinoma | Cellular proliferation, migration, and invasion | Up-regulation of ZEB1, ZEB2, N-CAD, VIMDown-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 EZH2Down-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 spongingUp-regulation of LIN28, NANOG, OCT4, SOX2 | C | x | (Wu et al., 2019b) |
| Osteosarcoma | Apoptosis  | activation of miR-139 spongingUp-regulation of BCL-2, RUNXDown-regulation of BAXInactivation 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, VIMDown-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-CADActivation of GSK-3β  | C | x | (He et al., 2018) |

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