Table SI. miRNAs regulate tumor progression, metastasis or therapy resistance by targeting IGF1R.

miRNAs	Functions in cancer progression
miR-770-5p	miR-770-5p restoration overcomes trastuzumab resistance in breast cancer by simultaneously suppressing HER2/EGFR/IGF1R crosstalk and downstream AKT/ERK/mTOR signaling pathways. This miRNA-mediated multipathway inhibition provides a potential strategy to reverse therapeutic resistance in HER2-positive breast cancers (55).
miRNA-376a-3p	miRNA-376a-3p overexpression reverses CPT-11 resistance in colorectal cancer by suppressing IGF1R-mediated PI3K/AKT signaling, thereby promoting apoptosis and inhibiting epithelial-mesenchymal transition. Therapeutic targeting of this miRNA-IGF1R axis may provide a strategy to overcome chemoresistance in advanced CRC (47).
miRNA-133b	The Aloin and CPT-11 combination synergistically inhibits colorectal cancer progression by upregulating miR-133b, leading to suppression of IGF1R and its downstream PI3K/AKT/mTOR and MEK/ERK signaling pathways. This dual regulatory mechanism enhances apoptosis and reduces cell viability, presenting a novel combinatorial strategy to overcome chemoresistance in CRC (35).
miR-15b	Calorie restriction exerts antitumor effects in TNBC by upregulating miR-15b expression, which directly targets and downregulates IGF1R signaling. This miRNA-mediated suppression of the IGF1 pathway represents a potential therapeutic strategy to mimic the anticancer benefits of calorie restriction in TNBC (56).
miR-99b-5p	Exosomal miR-99b-5p derived from human bone marrow mesenchymal stem cells suppresses prostate cancer progression by directly targeting and downregulating IGF1R expression, thereby inhibiting tumor cell proliferation, migration and epithelial-mesenchymal transition. This stem cell-mediated intercellular communication represents a novel therapeutic approach for IGF1R-driven cancers through miRNA delivery (57).
miR-144	miR-144 acts as a tumor suppressor in CRC by directly targeting NUDCD1, leading to subsequent inhibition of the IGF1R-ERK1/2 signaling pathway and suppression of tumor proliferation and metastasis. This newly identified miR-144/NUDCD1/IGF1R regulatory axis represents a promising therapeutic target for intervening in CRC progression (58).
miR-98-5p	The miR-98-5p/IGF2 axis contributes to Herceptin resistance in HER2-positive breast cancer by promoting IGF1R/HER2 heterodimer formation and subsequent AKT/mTOR pathway activation. Restoration of miR-98-5p expression sensitizes resistant cells to Herceptin by targeting IGF2, presenting a promising therapeutic strategy to overcome trastuzumab resistance (46).
miR-520b	miR-520b enhances doxorubicin sensitivity in breast cancer by directly targeting and downregulating IGF-1R expression, thereby suppressing the PI3K/AKT signaling pathway and promoting tumor cell apoptosis. This miRNA-mediated regulation of IGF-1R represents a potential therapeutic strategy to overcome chemoresistance in breast cancer treatment (59).
miR-99a	miR-99a acts as a tumor suppressor in cervical cancer by directly targeting and downregulating IGF1R expression, thereby inhibiting cell proliferation and migration while promoting apoptosis. Restoration of miR-99a function presents a potential therapeutic strategy to counteract IGF1R-driven oncogenic signaling in cervical malignancies (60).
miR-194-5p	NF-κB-mediated suppression of miR-194-5p drives ovarian tumorigenesis by unleashing IGF1R and PPFIBP expression, resulting in enhanced cancer cell proliferation, invasion and metastasis. This multi-layer regulatory axis reveals novel therapeutic opportunities for targeting transcriptional and post-transcriptional mechanisms in ovarian cancer progression (61).

miR/miRNA, microRNA; IGF-1R, insulin-like growth factor 1 receptor; CRC, colorectal cancer; TNBC, triple-negative breast cancer.