Supplementary Tables

Suppl. Table 1. Studies reporting the impact of MB-FUS delivery of anticancer agents in murine brain tumor models.

Therapeutic agent	Size	Tumor model [a]	Fold increase in DD (W.R.T. drug only)	Increase [%] in median survival (W.R.T. drug only)	Ref
Chemotherapy					
Doxorubicin	580 Da	GL261 and SMA-560 glioma (B6-albino mouse)	4-fold	68.2%	[1]
Doxorubicin	580 Da	9L Gliosarcoma (Rat)	2-fold	-	[2]
BCNU	214 Da	C6 glioma model (Rat)	3-fold	65.6%	[3]
Temozolomide (TMZ)	194 Da	9L Gliosarcoma (Rat)	1.7-fold	12.2%	[4]
Temozolomide (TMZ)	194 Da	9L Gliosarcoma (Rat)	-	-	[5]
Temozolomide (TMZ)	194 Da	U87 glioma model (Mouse)	2-fold	12.5%	[6]
Carboplatin	380 Da	F98 glioma (Rat)	2.9-fold	48%	[7]
Irinotecan	580 Da	F98 glioma (Rat)	3.2-fold	0% (No improvement)	[8]
Doxorubicin	580 Da	SU-DIPG-17 orthotopic xenografts (mouse)	4-fold	0% (No improvement)	[9]
Etoposide	590 Da	MGPP3 glioma (mouse)	3.5-fold	31.6%	[10]

Carboplatin	588 Da	U87 and 6240 PDX (mouse)	No quantification for carboplatin in tumor.	-	[11]
Doxorubicin	580 Da	Human HER2^{+} BT474 (mouse)	7-fold	-	[12]
Etoposide	590 Da	Diffuse intrinsic pontine glioma (mouse)	5-fold	-	[13]
Antibody					
Herceptin (trastuzumab)	148 kDa	Human HER2-positive BT474 (Rat)	-	-	[14]
HER2-targeting antibodies (trastuzumab and pertuzumab)	148 kDa	Human HER2-positive MDA-MB-361 (Rat)	-	-2.7%	[15]
Interleukin-12 (IL-12)	75 kDa	C6 glioma (Rat)	1.5-fold	15.4%	[16]
Bevacizumab	150 kDa	U87 glioma (Mouse)	6-fold	58.7%	[17]
EphA2-4B3 (IgG2a)	130 kDa	High grade glioma (PDX)	2-fold	-	[18]
Anti-CD47	150 kDa	GL261 Glioma (mouse)	2.2-fold	40%	[19]
ado-trastuzumab emtansine (T-DM1)	148 kDa	Human HER2^{+} BT474 (mouse)	2-fold	-	[12]
Anti-PD-1	32kDa	GL261 glioma model (mouse)		48.7%	[20]
Nanoparticles					
Liposomal doxorubicin (Doxil)	90 nm	9L Gliosarcoma (Rats)	-	0% (No improvement)	[21]
AP-1 targeted - Liposomal doxorubicin	116± 30 nm	Human GBM 8401 (NOD-scid	2.5-fold	-	[22]

(AP-1-Lipo-DOX)		Mice)			
Liposomal doxorubicin (Lipo-DOX); AP-1 targeted - Liposomal doxorubicin (AP1-Lipo-DOX)	100-120 nm	Human GBM 8401 (NOD-scid Mice)	4.4-fold (untargeted liposomal doxorubicin) 3.7-fold (AP-1 liposomal doxorubicin)	-	[23]
Liposomal doxorubicin (Lipo-DOX)	90 nm	9L Gliosarcoma (Rat)		72%	[24]
Cisplatin in Brain-Penetrating Nanoparticles	60 nm	9L Gliosarcoma and F98 glioma (Rats)	28-fold	0% (No improvement)	[25]
Paclitaxel liposomes (PTX-LIPO)	~90 nm	U87 MG glioblastoma (Mice)	2-fold	14.8%	[26]
Liposomal doxorubicin (Lipo-DOX)	90 nm	9L Gliosarcoma (Rat)	2-fold	-	[27]
Cilengitide (CGT) (Peptide)	100 nm 588.67 g/mol	C6 glioma model (Rat)	-	17.4% (CGT-modified-NP) 166.4% (CGT-NP)	[28]
αEGFR-SERS440 Gold Nanoparticles (GNPs)	50-120 nm (PEG-coated)	9L gliosarcoma model (Rat)	no *in vivo* statistics were provided	-	[29]
IL-4 receptor targeted Liposomal doxorubicin (IL-4-Lipo-DOX)	100-120 nm	Human GBM 8401 model (NOD-scid Mice)	2-fold	15.4%	[30]
Liposomal doxorubicin (Lipo-DOX)	90 nm	9L Gliosarcoma (Rat)	7-fold	-	[31]
Liposomal doxorubicin (Doxil)	90 nm	F98 glioma (Rats)	10-fold		[32]

Albumin-bound paclitaxel	130 nm	MES83 and GBM12 Glioma PDX (mice)	-	12.9% (MES83) 7.9% (GBM12, not statistically significant)	[33]
Folate-conjugated Polymersomal (Doxorubicin) (FPD)		C6 glioma model (Rat)	5.1-fold	51.7%	[34]
Hollow mesoporous organosilica NPs (Doxorubicin)	50 nm	U87 glioblastoma model (Mice)	-	48.6%	[35]
cisplatin-gold-NP conjugates	7 nm	U251 GBM xenograft (NOD-scid Mice)	-	-	[36]
brain-penetrating nanoparticle (BPN) gene vectors	50-100 nm	U87 glioma B16F1 melanoma (mice)	2.3-fold	-	[37]
LPH (siRNA)	40-50 nm	GL261 Glioma, SMO medulloblastoma (mice)	10-fold	-	[38]
Magnetic Nanoparticles					
BCNU - MNP	~10–20 nm	C6 glioma (Rat)	-	no survival values were provided	[39]
Epirubicin - MNP	~12 nm	C6 glioma (Rat)	2.6-fold	-	[40]
Doxorubicin – SPIO	~36 nm (SPIO); ~3 µm; (MBs)	C6 glioma (Rat)	2-fold	-	[41]
Microbubble-drug conjugates					
BCNU	214 Da (BCNU); ~1 µm (MBs)	C6 glioma (Rat)	8-fold	12%	[42]

VEGFR2-BCNU (Antiangiogenic-targeting)	214 Da (BCNU); ~1.8 µm (MBs)	C6 glioma (Rat)	-	61.5%	[43]
Doxorubicin – SPIO	~36 nm (SPIO); ~1 µm (MBs)	C6 glioma (Rat)	1.6-fold	-	[44]
shBirc5-lipo-NGR (NGR peptide and shRNA dual targeting)	2.9 µm MB-drug complex	C6 glioma (Rat)	-	40.7%	[45]
PEBCA-based NP (nanoparticles)	274nm (NP); 1.6 µm (MBs)	H1_DL2 Melanoma brain metastases (NOD-scid Mice)	No quantification for NP in tumor.	-	[46]
LPHNs-cRGD (nanoparticles loaded with CRISPR/Cas9 plasmids)	179 nm (NP) 2.9 µm (MB-drug complex)	T98G Glioma (NOD-SCID mice)	-	65.4%	
Virus					
Herpes virus gene (HSV1-tk) with Ganciclovir prodrug (GCV)	5.5 MDa (152 kbp)	F98 glioma (Rats)	3-fold	-	[47]
Herpes virus gene (HSV1-tk) with Ganciclovir prodrug (GCV)	5.5 MDa (152 kbp)	C6 glioma (Rat)	2.3-fold	Survival for drug only not reported	[48]

Suppl. Table 2. Summary of studies reporting the impact of MB-FUS on BBB in healthy animals that included information about the acoustic emissions and tissue damage; summarized in Fig. 4.

<table>
<tr><th>Animal</th><th>Pressure</th><th>Frequency</th><th>Harmonic</th><th>U-harmonic</th><th>Broadband</th><th>BBB Opening</th><th>Damage</th><th>Ref.</th></tr>
<tr><td>Rat</td><td>371 kPa</td><td>0.230MHz</td><td>Yes</td><td>Yes</td><td>Yes</td><td>Yes</td><td>Yes</td><td>[49]</td></tr>
<tr><td rowspan="3">Macaque</td><td>100 kPa</td><td>0.22MHz</td><td>NO</td><td>NO</td><td>NO</td><td>NO</td><td>NO</td><td rowspan="3">[50]</td></tr>
<tr><td>150 kPa</td><td>0.22MHz</td><td>YES</td><td>NO</td><td>NO</td><td>YES</td><td>NO</td></tr>
<tr><td>300 kPa</td><td>0.22MHz</td><td>YES</td><td>YES</td><td>NO</td><td>YES</td><td>YES</td></tr>
<tr><td rowspan="3">Macaque</td><td>175 kPa</td><td>0.257MHz</td><td>NO</td><td>NO</td><td>NO</td><td>NO</td><td>NO</td><td rowspan="3">[51]</td></tr>
<tr><td>275 kPa</td><td>0.257MHz</td><td>YES</td><td>YES</td><td>SOME</td><td>YES</td><td>NO</td></tr>
<tr><td>275 kPa</td><td>0.257MHz</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td rowspan="3">Mouse</td><td>300 kPa</td><td>1.5MHz</td><td>YES</td><td>NO</td><td>NO</td><td>YES</td><td>NO</td><td rowspan="3">[52]</td></tr>
<tr><td>450 kPa</td><td>1.5MHz</td><td>YES</td><td>YES</td><td>SOME</td><td>YES</td><td>YES</td></tr>
<tr><td>600 kPa</td><td>1.5MHz</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td rowspan="7">Macaque</td><td>300 kPa</td><td>0.5MHz</td><td>YES</td><td>YES</td><td>FEW</td><td>YES</td><td>NO</td><td rowspan="7">[53]</td></tr>
<tr><td>450 kPa</td><td>0.5MHz</td><td>YES</td><td>YES</td><td>SOME</td><td>YES</td><td>NO</td></tr>
<tr><td>600 kPa</td><td>0.5 MHz</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td>275 kPa</td><td>0.5 MHz</td><td>YES</td><td>NO</td><td>NO</td><td>YES</td><td>NO</td></tr>
<tr><td>400 kPa</td><td>0.5 MHz</td><td>YES</td><td>YES</td><td>NO</td><td>YES</td><td>NO</td></tr>
<tr><td>450 kPa</td><td>0.5 MHz</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td><td>NO</td></tr>
<tr><td>600 kPa</td><td>0.5 MHz</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td><td>NO</td></tr>
<tr><td rowspan="4">Mouse</td><td>150 kPa</td><td>1.53 MHz</td><td>SOME</td><td>NO</td><td>NO</td><td>NO</td><td>NO</td><td rowspan="4">[54]</td></tr>
<tr><td>300 kPa</td><td>1.53 MHz</td><td>YES</td><td>YES</td><td>NO</td><td>YES</td><td>NO</td></tr>
<tr><td>450 kPa</td><td>1.53 MHz</td><td>YES</td><td>YES</td><td>SOME</td><td>YES</td><td>NO</td></tr>
<tr><td>600 kPa</td><td>1.53 MHz</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td rowspan="12">Mouse</td><td>150 kPa</td><td>1.5 MHz</td><td>YES</td><td>NO</td><td>NO</td><td>NO</td><td>NO</td><td rowspan="12">[55]</td></tr>
<tr><td>300 kPa</td><td>1.5 MHz</td><td>YES</td><td>NO</td><td>NO</td><td>NO</td><td>NO</td></tr>
<tr><td>450 kPa</td><td>1.5 MHz</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td><td>NO</td></tr>
<tr><td>600 kPa</td><td>1.5 MHz</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td>150 kPa</td><td>1.5 MHz</td><td>YES</td><td>NO</td><td>NO</td><td>NO</td><td>NO</td></tr>
<tr><td>300 kPa</td><td>1.5 MHz</td><td>YES</td><td>NO</td><td>NO</td><td>YES</td><td>NO</td></tr>
<tr><td>450 kPa</td><td>1.5 MHz</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td>600 kPa</td><td>1.5 MHz</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td>150 kPa</td><td>1.5 MHz</td><td>YES</td><td>NO</td><td>NO</td><td>NO</td><td>NO</td></tr>
<tr><td>300 kPa</td><td>1.5 MHz</td><td>YES</td><td>NO</td><td>NO</td><td>YES</td><td>NO</td></tr>
<tr><td>450 kPa</td><td>1.5 MHz</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td>600 kPa</td><td>1.5 MHz</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td rowspan="4">Macaque</td><td>275 kPa</td><td>0.5 MHz</td><td>YES</td><td>YES</td><td>NO</td><td>YES</td><td>NO</td><td rowspan="4">[56]</td></tr>
<tr><td>350 kPa</td><td>0.5 MHz</td><td>YES</td><td>YES</td><td>NO</td><td>YES</td><td>NO</td></tr>
<tr><td>450 kPa</td><td>0.5 MHz</td><td>YES</td><td>YES</td><td>NO</td><td>YES</td><td>NO</td></tr>
<tr><td>600 kPa</td><td>0.5 MHz</td><td>YES</td><td>YES</td><td>NO</td><td>YES</td><td>NO</td></tr>
<tr><td rowspan="5">Mouse</td><td colspan="2">0.41 MI</td><td>YES</td><td>NO</td><td>NO</td><td>YES</td><td>NO</td><td rowspan="5">[57]</td></tr>
<tr><td colspan="2">0.56 MI</td><td>YES</td><td>NO</td><td>NO</td><td>YES</td><td>NO</td></tr>
<tr><td colspan="2">1.12 MI</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td><td>YES</td></tr>
<tr><td colspan="2">0.43 MI</td><td>YES</td><td>NO</td><td>NO</td><td>YES</td><td>NO</td></tr>
<tr><td colspan="2">0.83 MI</td><td>yes</td><td>yes</td><td>yes</td><td>yes</td><td>yes</td></tr>
</table>

Rabbit	140 kPa	0.26 MHz	YES	NO	NO	NO	NO	[58]
	290 kPa	0.26 MHz	YES	YES	NO	YES	NO	
	400 kPa	0.26 MHz	YES	YES	SOME	YES	YES	
	570 kPa	0.26 MHz	YES	YES	YES	YES	YES	
Mouse	150 kPa	1.5 MHz	NO	NO	NO	NO	NO	[59]*
	300 kPa	1.5 MHz	YES	NO	NO	YES	NO	
	450 kPa	1.5 MHz	YES	YES	NO	YES	NO	
Mouse	450 kPa	1.5 MHz	YES	SOME	NO	YES	NO	[60]**
	1500 kPa	1.5 MHz	YES	YES	YES	YES	YES	
Mouse	450 kPa	1.5 MHz	YES	NO	NO	NO	NO	[61]
	750 kPa	1.5 MHz	YES	YES	YES	YES	YES	
Mouse	225 kPa	1.5 MHz	YES	NO	NO	NO	NO	[62]***
	300 kPa	1.5 MHz	YES	NO	NO	YES	NO	
	450 kPa	1.5 MHz	YES	YES	SOME	YES	NO	
	600 kPa	1.5 MHz	YES	YES	YES	YES	YES	
Mouse	200 kPa	0.5 MHz	YES	YES	NO	YES	NO	[63]
	300 kPa	0.5 MHz	YES	YES	YES	SOME	NO	
	600 kPa	0.5 MHz	YES	YES	YES	YES	YES	

* Only data from OFB were used.

** Only data from Definity were used.

*** Only data from C24, 1000 cycles were used.

Note : The metanalysis contains publications in which focal pressure, excitation frequency, level of harmonics, ultraharmonics, broadband, BBB-opening evidence, and T2/histology were reported. Mechanical indices were calculated by dividing reported/estimated in-skull pressure (in megapascals) by square root of frequency in megahertz).

Suppl. Table 3. Summary of studies reporting the impact of MB-FUS alone on survival in murine brain tumor models.

Tumor model	Frequency [MHz]	Pressure (P_-) [MPa]	M.I.	Microbubble Type	Key findings
SMA-560 glioma (B6-albino mouse)	0.6	0.4	0.52	BG6895 infusion	No difference in median survival time. [64]
C6 glioma (Rat)	0.4	0.62	0.98	Sonovue 0.0025 mg/kg	Median survival time decreased by 10.5% after FUS (not statistically significant). [65, p.]
U87 glioma (Mouse)	0.5	0.3 - 0.7	0.42 - 0.99	Sonovue 4 µg	Modest improvement in survival (IST median 8.6%). Not statistically significant.[66]
MGPP3 glioma (mouse)	1.5	0.7	0.57	Lipid shell 1 mL/kg	No difference in median survival time. [67]
C6 glioma (Rat)	0.5	0.36 - 0.7	0.51 - 0.99	Sonovue 0.1 mL/kg	Modest improvement in survival (IST median 9.5%). Not statistically significant. [68]
U87 glioma (Mouse)	0.4	0.4	0.63	Sonovue 10 µL	Modest improvement in survival (IST median 9.68%). Not

					statistically significant (P=0.5407). [69]
GL261 Glioma (mouse)	1.1	0.4	0.38	Albumin shell 1E5 MBs/g	No statistically significant difference in median survival time. [70]
9L Gliosarcoma (Rat)	1.7	0.6	0.46	Definity 0.01 mL/kg	No difference in median survival time. [71]
9L Gliosarcoma (Rat)	0.69	0.55 - 0.81	0.66 - 0.98	Definity 0.01 ml/kg	Multiple treatments with ultrasound shows no difference in median survival time compares to non-FUS group.[72]
U87 glioma (Mouse)	1.1	0.6	0.57	Lipid shell 0.2 ml/kg	No difference in median survival time. [73]
U87 glioma (Mouse)	1	0.3	0.3	-	No difference in median survival time. [74]
C6 glioma (Rat)	1	-	-	Lipid shell bubble	Modest improvement in survival (IST median 14%). Not statistically significant. [75]
Average	-	0.48 - 0.58	0.55 - 0.68	-	No statistically significant improvement in survival
Median	-	0.4 - 0.6	0.52 - 0.57	-	

References

[1] Z. Kovacs, B. Werner, A. Rassi, J. O. Sass, E. Martin-Fiori, and M. Bernasconi, “Prolonged survival upon ultrasound-enhanced doxorubicin delivery in two syngenic glioblastoma mouse models,” *Journal of Controlled Release*, vol. 187, pp. 74–82, Aug. 2014.

[2] J. Park, M. Aryal, N. Vykhodtseva, Y.-Z. Zhang, and N. McDannold, “Evaluation of permeability, doxorubicin delivery, and drug retention in a rat brain tumor model after ultrasound-induced blood-tumor barrier disruption,” *Journal of Controlled Release*, vol. 250, pp. 77–85, Mar. 2017.

[3] H.-L. Liu, M.-Y. Hua, P.-Y. Chen, P.-C. Chu, C.-H. Pan, H.-W. Yang, C.-Y. Huang, J.-J. Wang, T.-C. Yen, and K.-C. Wei, “Blood-Brain Barrier Disruption with Focused Ultrasound Enhances Delivery of Chemotherapeutic Drugs for Glioblastoma Treatment,” *Radiology*, vol. 255, no. 2, pp. 415–425, Apr. 2010.

[4] K.-C. Wei, P.-C. Chu, H.-Y. J. Wang, C.-Y. Huang, P.-Y. Chen, H.-C. Tsai, Y.-J. Lu, P.-Y. Lee, I.-C. Tseng, L.-Y. Feng, P.-W. Hsu, T.-C. Yen, and H.-L. Liu, “Focused Ultrasound-Induced Blood–Brain Barrier Opening to Enhance Temozolomide Delivery for Glioblastoma Treatment: A Preclinical Study,” *PLOS ONE*, vol. 8, no. 3, p. e58995, Mar. 2013.

[5] Q. Dong, L. He, L. Chen, and Q. Deng, “Opening the Blood-Brain Barrier and Improving the Efficacy of Temozolomide Treatments of Glioblastoma Using Pulsed, Focused Ultrasound with a Microbubble Contrast Agent,” *BioMed Research International*, vol. 2018, p. e6501508, Nov. 2018.

[6] H.-L. Liu, C.-Y. Huang, J.-Y. Chen, H.-Y. J. Wang, P.-Y. Chen, and K.-C. Wei, “Pharmacodynamic and Therapeutic Investigation of Focused Ultrasound-Induced Blood-Brain Barrier Opening for Enhanced Temozolomide Delivery in Glioma Treatment,” *PLOS ONE*, vol. 9, no. 12, p. e114311, Dec. 2014.

[7] N. McDannold, Y. Zhang, J. G. Supko, C. Power, T. Sun, C. Peng, N. Vykhodtseva, A. J. Golby, and D. A. Reardon, “Acoustic feedback enables safe and reliable carboplatin delivery across the blood-brain barrier with a clinical focused ultrasound system and improves survival in a rat glioma model,” *Theranostics*, vol. 9, no. 21, pp. 6284–6299, Aug. 2019.

[8] N. McDannold, Y. Zhang, J. G. Supko, C. Power, T. Sun, N. Vykhodtseva, A. J. Golby, and D. A. Reardon, "Blood-brain barrier disruption and delivery of irinotecan in a rat model using a clinical transcranial MRI-guided focused ultrasound system," *Sci Rep*, vol. 10, May 2020.

[9] J. Ishida, S. Alli, A. Bondoc, B. Golbourn, N. Sabha, K. Mikloska, S. Krumholtz, D. Srikanthan, N. Fujita, A. Luck, C. Maslink, C. Smith, K. Hynynen, and J. Rutka, "MRI-guided focused ultrasound enhances drug delivery in experimental diffuse intrinsic pontine glioma," *Journal of Controlled Release*, vol. 330, pp. 1034–1045, Feb. 2021.

[10] H.-J. Wei, P. S. Upadhyayula, A. N. Pouliopoulos, Z. K. Englander, X. Zhang, C.-I. Jan, J. Guo, A. Mela, Z. Zhang, T. J. C. Wang, J. N. Bruce, P. D. Canoll, N. A. Feldstein, S. Zacharoulis, E. E. Konofagou, and C.-C. Wu, "Focused Ultrasound-Mediated Blood-Brain Barrier Opening Increases Delivery and Efficacy of Etoposide for Glioblastoma Treatment," *International Journal of Radiation Oncology*Biology*Physics*, Dec. 2020.

[11] A. Dréan, N. Lemaire, G. Bouchoux, L. Goldwirt, M. Canney, L. Goli, A. Bouzidi, C. Schmitt, J. Guehennec, M. Verreault, M. Sanson, J.-Y. Delattre, K. Mokhtari, F. Sottilini, A. Carpentier, and A. Idbaih, "Temporary blood–brain barrier disruption by low intensity pulsed ultrasound increases carboplatin delivery and efficacy in preclinical models of glioblastoma," *J Neurooncol*, vol. 144, no. 1, pp. 33–41, Aug. 2019.

[12] C. D. Arvanitis, V. Askoxylakis, Y. Guo, M. Datta, J. Kloepper, G. B. Ferraro, M. O. Bernabeu, D. Fukumura, N. McDannold, and R. K. Jain, "Mechanisms of enhanced drug delivery in brain metastases with focused ultrasound-induced blood–tumor barrier disruption," *Proceedings of the National Academy of Sciences*, vol. 115, no. 37, pp. E8717–E8726, Sep. 2018.

[13] Z. K. Englander, H.-J. Wei, A. N. Pouliopoulos, E. Bendau, P. Upadhyayula, C.-I. Jan, E. F. Spinazzi, N. Yoh, M. Tazhibi, N. M. McQuillan, T. J. C. Wang, J. N. Bruce, P. Canoll, N. A. Feldstein, S. Zacharoulis, E. E. Konofagou, and C.-C. Wu, "Focused ultrasound mediated blood-brain barrier opening is safe and feasible in a murine pontine glioma model," *Sci Rep*, vol. 11, no. 1, p. 6521, Mar. 2021.

[14] E.-J. Park, Y.-Z. Zhang, N. Vykhodtseva, and N. McDannold, "Ultrasound-mediated blood-brain/blood-tumor barrier disruption improves outcomes with trastuzumab in a breast cancer brain metastasis model," *J Control Release*, vol. 163, no. 3, pp. 277–284, Nov. 2012.

[15] T. Kobus, I. K. Zervantonakis, Y. Zhang, and N. J. McDannold, "Growth inhibition in a brain metastasis model by antibody delivery using focused ultrasound-mediated blood-brain barrier disruption," *J Control Release*, vol. 238, pp. 281–288, Sep. 2016.

[16] P.-Y. Chen, H.-Y. Hsieh, C.-Y. Huang, C.-Y. Lin, K.-C. Wei, and H.-L. Liu, "Focused ultrasound-induced blood–brain barrier opening to enhance interleukin-12 delivery for brain tumor immunotherapy: a preclinical feasibility study," *J Transl Med*, vol. 13, Mar. 2015.

[17] H.-L. Liu, P.-H. Hsu, C.-Y. Lin, C.-W. Huang, W.-Y. Chai, P.-C. Chu, C.-Y. Huang, P.-Y. Chen, L.-Y. Yang, J. S. Kuo, and K.-C. Wei, "Focused Ultrasound Enhances Central Nervous System Delivery of Bevacizumab for Malignant Glioma Treatment," *Radiology*, vol. 281, no. 1, pp. 99–108, May 2016.

[18] C. Brighi, L. Reid, A. L. White, L. A. Genovesi, M. Kojic, A. Millar, Z. Bruce, B. W. Day, S. Rose, A. K. Whittaker, and S. Puttick, "MR-guided focused ultrasound increases antibody delivery to nonenhancing high-grade glioma," *Neuro Oncol Adv*, vol. 2, no. 1, Jan. 2020.

[19] N. D. Sheybani, V. R. Breza, S. Paul, K. S. McCauley, S. S. Berr, G. W. Miller, K. D. Neumann, and R. J. Price, "ImmunoPET-informed sequence for focused ultrasound-targeted mCD47 blockade controls glioma," *Journal of Controlled Release*, vol. 331, pp. 19–29, Mar. 2021.

[20] A. Sabbagh, K. Beccaria, X. Ling, A. Marisetty, M. Ott, H. Caruso, E. Barton, L.-Y. Kong, D. Fang, K. Latha, D. Y. Zhang, J. Wei, J. F. de Groot, M. A. Curran, G. Rao, J. Hu, C. Desseaux, G. Bouchoux, M. Canney, A. Carpentier, and A. B. Heimberger, "Opening of the blood-brain barrier using low-intensity pulsed ultrasound enhances responses to immunotherapy in preclinical glioma models," *Clin Cancer Res*, May 2021.

[21] L. H. Treat, N. McDannold, Y. Zhang, N. Vykhodtseva, and K. Hynynen, "Improved Anti-Tumor Effect of Liposomal Doxorubicin After Targeted Blood-Brain Barrier Disruption by MRI-Guided Focused Ultrasound in Rat Glioma," *Ultrasound in Medicine & Biology*, vol. 38, no. 10, pp. 1716–1725, Oct. 2012.

[22] F.-Y. Yang, H.-E. Wang, R.-S. Liu, M.-C. Teng, J.-J. Li, M. Lu, M.-C. Wei, and T.-T. Wong, "Pharmacokinetic Analysis of 111In-Labeled Liposomal Doxorubicin in Murine Glioblastoma after Blood-Brain Barrier Disruption by Focused Ultrasound," *PLOS ONE*, vol. 7, no. 9, p. e45468, Sep. 2012.

[23] F.-Y. Yang, M.-C. Teng, M. Lu, H.-F. Liang, Y.-R. Lee, C.-C. Yen, M.-L. Liang, and T.-T. Wong, "Treating glioblastoma multiforme with selective high-dose liposomal doxorubicin chemotherapy induced by repeated focused ultrasound," *Int J Nanomedicine*, vol. 7, pp. 965–974, 2012.

[24] M. Aryal, N. Vykhodtseva, Y.-Z. Zhang, J. Park, and N. McDannold, "Multiple treatments with liposomal doxorubicin and ultrasound-induced disruption of blood-tumor and blood-brain barriers improves outcomes in a rat glioma model," *J Control Release*, vol. 169, no. 0, pp. 103–111, Jul. 2013.

[25] K. F. Timbie, U. Afzal, A. Date, C. Zhang, J. Song, G. Wilson Miller, J. S. Suk, J. Hanes, and R. J. Price, "MR image-guided delivery of cisplatin-loaded brain-penetrating nanoparticles to invasive glioma with focused ultrasound," *Journal of Controlled Release*, vol. 263, pp. 120–131, Oct. 2017.

[26] Y. Shen, Z. Pi, F. Yan, C.-K. Yeh, X. Zeng, X. Diao, Y. Hu, S. Chen, X. Chen, and H. Zheng, "Enhanced delivery of paclitaxel liposomes using focused ultrasound with microbubbles for treating nude mice bearing intracranial glioblastoma xenografts," *Int J Nanomedicine*, vol. 12, pp. 5613–5629, Aug. 2017.

[27] M. Aryal, J. Park, N. Vykhodtseva, Y.-Z. Zhang, and N. McDannold, "Enhancement in blood-tumor barrier permeability and delivery of liposomal doxorubicin using focused ultrasound and microbubbles: evaluation during tumor progression in a rat glioma model," *Phys Med Biol*, vol. 60, no. 6, pp. 2511–2527, Mar. 2015.

[28] Y.-Z. Zhao, Q. Lin, H. L. Wong, X.-T. Shen, W. Yang, H.-L. Xu, K.-L. Mao, F.-R. Tian, J.-J. Yang, J. Xu, J. Xiao, and C.-T. Lu, "Glioma-targeted therapy using Cilengitide nanoparticles combined with UTMD enhanced delivery," *Journal of Controlled Release*, vol. 224, pp. 112–125, Feb. 2016.

[29] R. J. Diaz, P. Z. McVeigh, M. A. O'Reilly, K. Burrell, M. Bebenek, C. Smith, A. B. Etame, G. Zadeh, K. Hynynen, B. C. Wilson, and J. T. Rutka, "Focused ultrasound delivery of Raman nanoparticles across the blood-brain barrier: Potential for targeting experimental brain tumors," *Nanomedicine: Nanotechnology, Biology and Medicine*, vol. 10, no. 5, pp. e1075–e1087, Jul. 2014.

[30] F.-Y. Yang, T.-T. Wong, M.-C. Teng, R.-S. Liu, M. Lu, H.-F. Liang, and M.-C. Wei, "Focused ultrasound and interleukin-4 receptor-targeted liposomal doxorubicin for enhanced targeted drug delivery and antitumor effect in glioblastoma multiforme," *Journal of Controlled Release*, vol. 160, no. 3, pp. 652–658, Jun. 2012.

[31] M. Aryal, N. Vykhodtseva, Y.-Z. Zhang, and N. McDannold, "Multiple sessions of liposomal doxorubicin delivery via focused ultrasound mediated blood–brain barrier disruption: A safety study," *Journal of Controlled Release*, vol. 204, pp. 60–69, Apr. 2015.

[32] T. Sun, Y. Zhang, C. Power, P. M. Alexander, J. T. Sutton, M. Aryal, N. Vykhodtseva, E. L. Miller, and N. J. McDannold, "Closed-loop control of targeted ultrasound drug delivery across the blood–brain/tumor barriers in a rat glioma model," *PNAS*, vol. 114, no. 48, pp. E10281–E10290, Nov. 2017.

[33] D. Y. Zhang, C. Dmello, L. Chen, V. A. Arrieta, E. Gonzalez-Buendia, J. R. Kane, L. P. Magnusson, A. Baran, C. D. James, C. Horbinski, A. Carpentier, C. Desseaux, M. Canney, M. Muzzio, R. Stupp, and A. M. Sonabend, "Ultrasound-mediated Delivery of Paclitaxel for Glioma: A Comparative Study of Distribution, Toxicity, and Efficacy of Albumin-bound Versus Cremophor Formulations," *Clin Cancer Res*, vol. 26, no. 2, pp. 477–486, Jan. 2020.

[34] Y.-C. Chen, C.-F. Chiang, S.-K. Wu, L.-F. Chen, W.-Y. Hsieh, and W.-L. Lin, "Targeting microbubbles-carrying TGFβ1 inhibitor combined with ultrasound sonication induce BBB/BTB disruption to enhance nanomedicine treatment for brain tumors," *Journal of Controlled Release*, vol. 211, pp. 53–62, Aug. 2015.

[35] M. Wu, W. Chen, Y. Chen, H. Zhang, C. Liu, Z. Deng, Z. Sheng, J. Chen, X. Liu, F. Yan, and H. Zheng, "Focused Ultrasound-Augmented Delivery of Biodegradable Multifunctional Nanoplatforms for Imaging-Guided Brain Tumor Treatment," *Advanced Science*, vol. 5, no. 4, p. 1700474, 2018.

[36] D. Coluccia, C. A. Figueiredo, M. Y. Wu, A. N. Riemenschneider, R. Diaz, A. Luck, C. Smith, S. Das, C. Ackerley, M. O'Reilly, K. Hynynen, and J. T. Rutka, "Enhancing Glioblastoma Treatment using Cisplatin-Gold-Nanoparticle Conjugates and Targeted Delivery with Magnetic Resonance-Guided Focused Ultrasound," *Nanomedicine: Nanotechnology, Biology and Medicine*, Feb. 2018.

[37] C. T. Curley, B. P. Mead, K. Negron, N. Kim, W. J. Garrison, G. W. Miller, K. M. Kingsmore, E. A. Thim, J. Song, J. M. Munson, A. L. Klibanov, J. S. Suk, J. Hanes, and R. J. Price, "Augmentation of brain tumor interstitial flow via focused ultrasound promotes brain-penetrating nanoparticle dispersion and transfection," *Science Advances*, vol. 6, no. 18, p. eaay1344, May 2020.

[38] Y. Guo, H. Lee, Z. Fang, A. Velalopoulou, J. Kim, M. B. Thomas, J. Liu, R. G. Abramowitz, Y. Kim, A. F. Coskun, D. P. Krummel, S. Sengupta, T. J. MacDonald, and C. Arvanitis, "Single-cell analysis reveals effective siRNA

delivery in brain tumors with microbubble-enhanced ultrasound and cationic nanoparticles," *Science Advances*, vol. 7, no. 18, p. eabf7390, Apr. 2021.

[39] P.-Y. Chen, H.-L. Liu, M.-Y. Hua, H.-W. Yang, C.-Y. Huang, P.-C. Chu, L.-A. Lyu, I.-C. Tseng, L.-Y. Feng, H.-C. Tsai, S.-M. Chen, Y.-J. Lu, J.-J. Wang, T.-C. Yen, Y.-H. Ma, T. Wu, J.-P. Chen, J.-I. Chuang, J.-W. Shin, C. Hsueh, and K.-C. Wei, "Novel magnetic/ultrasound focusing system enhances nanoparticle drug delivery for glioma treatment," *Neuro Oncol*, vol. 12, no. 10, pp. 1050–1060, Oct. 2010.

[40] H.-L. Liu, M.-Y. Hua, H.-W. Yang, C.-Y. Huang, P.-C. Chu, J.-S. Wu, I.-C. Tseng, J.-J. Wang, T.-C. Yen, P.-Y. Chen, and K.-C. Wei, "Magnetic resonance monitoring of focused ultrasound/magnetic nanoparticle targeting delivery of therapeutic agents to the brain," *Proc Natl Acad Sci U S A*, vol. 107, no. 34, pp. 15205–15210, Aug. 2010.

[41] C.-H. Fan, Y.-H. Cheng, C.-Y. Ting, Y.-J. Ho, P.-H. Hsu, H.-L. Liu, and C.-K. Yeh, "Ultrasound/Magnetic Targeting with SPIO-DOX-Microbubble Complex for Image-Guided Drug Delivery in Brain Tumors," *Theranostics*, vol. 6, no. 10, pp. 1542–1556, Jun. 2016.

[42] C.-Y. Ting, C.-H. Fan, H.-L. Liu, C.-Y. Huang, H.-Y. Hsieh, T.-C. Yen, K.-C. Wei, and C.-K. Yeh, "Concurrent blood–brain barrier opening and local drug delivery using drug-carrying microbubbles and focused ultrasound for brain glioma treatment," *Biomaterials*, vol. 33, no. 2, pp. 704–712, Jan. 2012.

[43] C.-H. Fan, C.-Y. Ting, H.-L. Liu, C.-Y. Huang, H.-Y. Hsieh, T.-C. Yen, K.-C. Wei, and C.-K. Yeh, "Antiangiogenic-targeting drug-loaded microbubbles combined with focused ultrasound for glioma treatment," *Biomaterials*, vol. 34, no. 8, pp. 2142–2155, Mar. 2013.

[44] C.-H. Fan, C.-Y. Ting, H.-J. Lin, C.-H. Wang, H.-L. Liu, T.-C. Yen, and C.-K. Yeh, "SPIO-conjugated, doxorubicin-loaded microbubbles for concurrent MRI and focused-ultrasound enhanced brain-tumor drug delivery," *Biomaterials*, vol. 34, no. 14, pp. 3706–3715, May 2013.

[45] G. Zhao, Q. Huang, F. Wang, X. Zhang, J. Hu, Y. Tan, N. Huang, Z. Wang, Z. Wang, and Y. Cheng, "Targeted shRNA-loaded liposome complex combined with focused ultrasound for blood brain barrier disruption and suppressing glioma growth," *Cancer Letters*, vol. 418, pp. 147–158, Apr. 2018.

[46] H. Baghirov, S. Snipstad, E. Sulheim, S. Berg, R. Hansen, F. Thorsen, Y. Mørch, C. de L. Davies, and A. K. O. Åslund, "Ultrasound-mediated delivery and distribution of polymeric nanoparticles in the normal brain parenchyma of a metastatic brain tumour model," *PLOS ONE*, vol. 13, no. 1, p. e0191102, Jan. 2018.

[47] F.-Y. Yang, W.-Y. Chang, W.-T. Lin, J.-J. Hwang, Y.-C. Chien, H.-E. Wang, and M.-L. Tsai, "Focused ultrasound enhanced molecular imaging and gene therapy for multifusion reporter gene in glioma-bearing rat model," *Oncotarget*, vol. 6, no. 34, pp. 36260–36268, Sep. 2015.

[48] E.-L. Chang, C.-Y. Ting, P.-H. Hsu, Y.-C. Lin, E.-C. Liao, C.-Y. Huang, Y.-C. Chang, H.-L. Chan, C.-S. Chiang, H.-L. Liu, K.-C. Wei, C.-H. Fan, and C.-K. Yeh, "Angiogenesis-targeting microbubbles combined with ultrasound-mediated gene therapy in brain tumors," *Journal of Controlled Release*, vol. 255, pp. 164–175, Jun. 2017.

[49] N. McDannold, Y. Zhang, J. G. Supko, C. Power, T. Sun, C. Peng, N. Vykhodtseva, A. J. Golby, and D. A. Reardon, "Acoustic feedback enables safe and reliable carboplatin delivery across the blood-brain barrier with a clinical focused ultrasound system and improves survival in a rat glioma model," *Theranostics*, vol. 9, no. 21, pp. 6284–6299, 2019.

[50] N. McDannold, C. D. Arvanitis, N. Vykhodtseva, and M. S. Livingstone, "Temporary Disruption of the Blood–Brain Barrier by Use of Ultrasound and Microbubbles: Safety and Efficacy Evaluation in Rhesus Macaques," *Cancer Res*, vol. 72, no. 14, pp. 3652–3663, Jul. 2012.

[51] C. D. Arvanitis, M. S. Livingstone, N. Vykhodtseva, and N. McDannold, "Controlled Ultrasound-Induced Blood-Brain Barrier Disruption Using Passive Acoustic Emissions Monitoring," *PLOS ONE*, vol. 7, no. 9, p. 16, 2012.

[52] E. E. Konofagou, "Optimization of the Ultrasound-Induced Blood-Brain Barrier Opening," *Theranostics*, vol. 2, no. 12, pp. 1223–1237, Dec. 2012.

[53] F. Marquet, Y.-S. Tung, T. Teichert, V. P. Ferrera, and E. E. Konofagou, "Noninvasive, Transient and Selective Blood-Brain Barrier Opening in Non-Human Primates In Vivo," *PLOS ONE*, vol. 6, no. 7, p. e22598, 22 2011.

[54] Y.-S. Tung, F. Vlachos, J. J. Choi, T. Deffieux, K. Selert, and E. E. Konofagou, "*In vivo* transcranial cavitation threshold detection during ultrasound-induced blood–brain barrier opening in mice," *Phys. Med. Biol.*, vol. 55, no. 20, pp. 6141–6155, Oct. 2010.

[55] Y.-S. Tung, F. Vlachos, J. A. Feshitan, M. A. Borden, and E. E. Konofagou, “The mechanism of interaction between focused ultrasound and microbubbles in blood-brain barrier opening in mice,” *The Journal of the Acoustical Society of America*, vol. 130, no. 5, pp. 3059–3067, Nov. 2011.
[56] S.-Y. Wu, Y.-S. Tung, F. Marquet, M. E. Downs, C. S. Sanchez, C. C. Chen, V. Ferrera, and E. Konofagou, “Transcranial Cavitation Detection in Primates during Blood-Brain Barrier Opening – A Performance Assessment Study,” *IEEE Trans Ultrason Ferroelectr Freq Control*, vol. 61, no. 6, pp. 966–978, Jun. 2014.
[57] P.-C. Chu, W.-Y. Chai, C.-H. Tsai, S.-T. Kang, C.-K. Yeh, and H.-L. Liu, “Focused Ultrasound-Induced Blood-Brain Barrier Opening: Association with Mechanical Index and Cavitation Index Analyzed by Dynamic Contrast-Enhanced Magnetic-Resonance Imaging,” *Sci Rep*, vol. 6, Sep. 2016.
[58] N. McDannold, N. Vykhodtseva, and K. Hynynen, “Targeted disruption of the blood–brain barrier with focused ultrasound: association with cavitation activity,” *Phys. Med. Biol.*, vol. 51, no. 4, pp. 793–807, Feb. 2006.
[59] S.-Y. Wu, S. M. Fix, C. B. Arena, C. C. Chen, W. Zheng, O. O. Olumolade, V. Papadopoulou, A. Novell, P. A. Dayton, and E. E. Konofagou, “Focused ultrasound-facilitated brain drug delivery using optimized nanodroplets: vaporization efficiency dictates large molecular delivery,” *Phys. Med. Biol.*, vol. 63, no. 3, p. 035002, Jan. 2018.
[60] O. O. Olumolade, S. Wang, G. Samiotaki, and E. E. Konofagou, “Longitudinal Motor and Behavioral Assessment of Blood–Brain Barrier Opening with Transcranial Focused Ultrasound,” *Ultrasound in Medicine & Biology*, vol. 42, no. 9, pp. 2270–2282, Sep. 2016.
[61] C. Sierra, C. Acosta, C. Chen, S.-Y. Wu, M. E. Karakatsani, M. Bernal, and E. E. Konofagou, “Lipid microbubbles as a vehicle for targeted drug delivery using focused ultrasound-induced blood–brain barrier opening,” *J Cereb Blood Flow Metab*, vol. 37, no. 4, pp. 1236–1250, Apr. 2017.
[62] S.-Y. Wu, C. C. Chen, Y.-S. Tung, O. O. Olumolade, and E. E. Konofagou, “Effects of the microbubble shell physicochemical properties on ultrasound-mediated drug delivery to the brain,” *Journal of Controlled Release*, vol. 212, pp. 30–40, Aug. 2015.
[63] F. MARQUET, Y.-S. TUNG, and E. E. KONOFAGOU, “FEASIBILITY STUDY OF A CLINICAL BLOOD–BRAIN BARRIER OPENING ULTRASOUND SYSTEM,” *Nano Life*, vol. 1, no. 3n04, p. 309, 2010.
[64] Z. Kovacs, B. Werner, A. Rassi, J. O. Sass, E. Martin-Fiori, and M. Bernasconi, “Prolonged survival upon ultrasound-enhanced doxorubicin delivery in two syngenic glioblastoma mouse models,” *Journal of Controlled Release*, vol. 187, pp. 74–82, Aug. 2014.
[65] H.-L. Liu, M.-Y. Hua, P.-Y. Chen, P.-C. Chu, C.-H. Pan, H.-W. Yang, C.-Y. Huang, J.-J. Wang, T.-C. Yen, and K.-C. Wei, “Blood-brain barrier disruption with focused ultrasound enhances delivery of chemotherapeutic drugs for glioblastoma treatment,” *Radiology*, vol. 255, no. 2, pp. 415–425, May 2010.
[66] H.-L. Liu, C.-Y. Huang, J.-Y. Chen, H.-Y. J. Wang, P.-Y. Chen, and K.-C. Wei, “Pharmacodynamic and Therapeutic Investigation of Focused Ultrasound-Induced Blood-Brain Barrier Opening for Enhanced Temozolomide Delivery in Glioma Treatment,” *PLoS One*, vol. 9, no. 12, Dec. 2014.
[67] H.-J. Wei, P. S. Upadhyayula, A. N. Pouliopoulos, Z. K. Englander, X. Zhang, C.-I. Jan, J. Guo, A. Mela, Z. Zhang, T. J. C. Wang, J. N. Bruce, P. D. Canoll, N. A. Feldstein, S. Zacharoulis, E. E. Konofagou, and C.-C. Wu, “Focused Ultrasound-Mediated Blood-Brain Barrier Opening Increases Delivery and Efficacy of Etoposide for Glioblastoma Treatment,” *International Journal of Radiation Oncology*Biology*Physics*, vol. 110, no. 2, pp. 539–550, Jun. 2021.
[68] P.-Y. Chen, H.-Y. Hsieh, C.-Y. Huang, C.-Y. Lin, K.-C. Wei, and H.-L. Liu, “Focused ultrasound-induced blood-brain barrier opening to enhance interleukin-12 delivery for brain tumor immunotherapy: a preclinical feasibility study,” *J Transl Med*, vol. 13, p. 93, 2015.
[69] H.-L. Liu, P.-H. Hsu, C.-Y. Lin, C.-W. Huang, W.-Y. Chai, P.-C. Chu, C.-Y. Huang, P.-Y. Chen, L.-Y. Yang, J. S. Kuo, and K.-C. Wei, “Focused Ultrasound Enhances Central Nervous System Delivery of Bevacizumab for Malignant Glioma Treatment,” *Radiology*, vol. 281, no. 1, pp. 99–108, 2016.
[70] N. D. Sheybani, V. R. Breza, S. Paul, K. S. McCauley, S. S. Berr, G. W. Miller, K. D. Neumann, and R. J. Price, “ImmunoPET-informed sequence for focused ultrasound-targeted mCD47 blockade controls glioma,” *Journal of Controlled Release*, vol. 331, pp. 19–29, Mar. 2021.
[71] L. H. Treat, N. McDannold, Y. Zhang, N. Vykhodtseva, and K. Hynynen, “Improved anti-tumor effect of liposomal doxorubicin after targeted blood-brain barrier disruption by MRI-guided focused ultrasound in rat glioma,” *Ultrasound Med Biol*, vol. 38, no. 10, pp. 1716–1725, Oct. 2012.

[72] M. Aryal, N. Vykhodtseva, Y.-Z. Zhang, J. Park, and N. McDannold, “Multiple treatments with liposomal doxorubicin and ultrasound-induced disruption of blood-tumor and blood-brain barriers improve outcomes in a rat glioma model,” *J Control Release*, vol. 169, no. 1–2, pp. 103–111, Jul. 2013.
[73] Y. Shen, Z. Pi, F. Yan, C.-K. Yeh, X. Zeng, X. Diao, Y. Hu, S. Chen, X. Chen, and H. Zheng, “Enhanced delivery of paclitaxel liposomes using focused ultrasound with microbubbles for treating nude mice bearing intracranial glioblastoma xenografts,” *Int J Nanomedicine*, vol. 12, pp. 5613–5629, 2017.
[74] M. Wu, W. Chen, Y. Chen, H. Zhang, C. Liu, Z. Deng, Z. Sheng, J. Chen, X. Liu, F. Yan, and H. Zheng, “Focused Ultrasound-Augmented Delivery of Biodegradable Multifunctional Nanoplatforms for Imaging-Guided Brain Tumor Treatment,” *Adv Sci (Weinh)*, vol. 5, no. 4, p. 1700474, Apr. 2018.
[75] G. Zhao, Q. Huang, F. Wang, X. Zhang, J. Hu, Y. Tan, N. Huang, Z. Wang, Z. Wang, and Y. Cheng, “Targeted shRNA-loaded liposome complex combined with focused ultrasound for blood brain barrier disruption and suppressing glioma growth,” *Cancer Letters*, vol. 418, pp. 147–158, Apr. 2018.