

## Supplementary Materials:

**Table S1.** The difference in the P value of the left tumor volume between the groups on day 12.

	Sham	5W	10W	Sham+PD-1	5W+PD-1	10W+PD-1
Sham	1	<b>0.035</b>	0.278	<b>0.005</b>	<b>0.031</b>	<b>&lt;0.001</b>
5W	-	1	0.399	<b>0.001</b>	<b>0.002</b>	<b>&lt;0.001</b>
10W	-	-	1	<b>0.015</b>	<b>0.020</b>	<b>0.002</b>
Sham+PD-1	-	-	-	1	0.867	<b>0.037</b>
5W+PD-1	-	-	-	-	1	0.350
10W+PD-1	-	-	-	-	-	1

Statistically significant results are shown in bold, with “-” indicating coincidence with the corresponding group.

**Table S2.** Recent pre-clinical trial about the combination of ablation and immunomodulation

Author	Species	Complete ablation	Ablation modality	Power	Immunomodulator	Results
Zhong et al. (doi:10.1080/02656736.2020.1836406)	Mouse	Yes	MWA	5 w for 3 min	DCs injection	Enhance CTLs activities, decrease Treg number, reduce IL-10 production, induce INF- $\mu$ , inhibit the growth of distant tumor.
Huang et al.(doi:10.1080/02656736.2022.2032406)	Mouse	Yes	MWA	5 w for 3 min	Anti-PD-1 antibody	Enhance survival, inhibit growth of distant tumor, induced tumor-specific immune response, increase Th1 response, resist tumor rechallenge.
Duan et al.(10.1080)	Mouse	Yes	MWA	5 w for 3 min	Anti-PD-1 antibody/a	Increase survival, resist tumor rechallenge,

/15384101.2020.1853942)					nti-CTLA4 body	enhance CTLs activities,increase Th1 response.
Sun et al. (doi:10.1016/j.biopha.2023.115351)	Mouse	iRFA (70 % necrosis and 30 % residual tumors)	RFA	70°C for 2 min	OK-432/antiPD-1 antibody	Enhance CTLs activites, decrease Treg in residual tumor, increase survival, inhibit growth of residual tumor, resist tumor rechallenge.
Tan et al(doi:10.1016/j.apsb.2022.08.006)	Mouse	Yes	CRA/MWA	2 freezing cycles /10 w for 30-60s	Anti-PD-1 antibody	CRA showed superior curative effect than MWA local tumor combining with anti-PD-L1 antibody by strengthening CTL/NK cell immune response.

DCs: dendritic cells; CTLs: cytotoxic T lymphocytes; Th1: type-1 helper T cells; RF: radiofrequency; CpG-oligodeoxynucleotides; Treg: regulatory T cells; CTLA-4: cytotoxic Tlymphocyte associated protein 4; PD-1: programmed cell death 1; iRFA: incomplete RFA; CRA: cryoablation.