

Target	ICPI	Trade name
PD-1	Nivolumab	OPDIVO
	Pembrolizumab	KEYTRUDA
	Tislelizumab	
	Camrelizumab	
	Spartalizumab	
PD-L1	Durvalumab	IMFINZI
	Atezolizumab	TECENTRIQ
	Avelumab	BAVENCIO
CTLA-4	Tremelimumab	
	Ipilimumab	YERVOY

Table (1): ICPIs under assessment in the major clinical trials for HCC (21).

Target		Design	Clinical number	trial	Phase	Endpoint
ICPIs as monotherapy						
PD-1	Nivolumab	Nivolumab vs. Sorafenib	NCT02576509	3	OS	
	Nivolumab	Nivolumab vs. placebo	NCT03383458	3	PFS	
	Pembrolizumab	Pembrolizumab vs. placebo	NCT03062358	3	OS	
	Pembrolizumab	Pembrolizumab	NCT03337841	2	RFS	
	Tislelizumab	Tislelizumab	NCT03419897	2	ORR	
	Tislelizumab	Tislelizumab vs. Sorafenib	NCT03412773	3	OS	
	Camrelizumab	Camrelizumab	NCT02989922	2/ 3	ORR/OS	
PD-L1	Avelumab	Avelumab	NCT03389126	2	ORR	
Combination with other immune-based therapies						
PD-1 and CTLA-4		Nivolumab + Ipilimumab	NCT03682276	1/2	ORR	
		Nivolumab + Ipilimumab	NCT03510871	2		
		Nivolumab +/- Ipilimumab	NCT03222076	2	Safety	
		Nivolumab +/- Ipilimumab	NCT03203304	1	Safety	
		Tremelimumab vs. Tremelimumab + Durvalumab vs. Sorafenib	NCT03298451	3	OS	
		Tremelimumab vs. Durvalumab vs. Tremelimumab + Durvalumab	NCT02519348	2	Safety	
PD-L1 and TIM-3		LY3300054 +/- LY3321367	NCT03099109	1	Safety	
PD-1 and LAG-3		REGN2810 +/- REGN3767	NCT03005782	1	Safety/ORR	
Combination with molecular targeted agents						
PD-L1 and anti-VEGF		Atezolizumab + Bevacizumab	NCT02715531	1	Safety/ORR	
PD-L1 and anti-VEGF		Atezolizumab + Bevacizumab vs. Sorafenib	NCT03434379	3	OS/ORR	
PD-1 and TKI		Pembrolizumab + Lenvatinib vs. Lenvatinib	NCT03713593	3	PFS/OS	
PD-1 and TKI		Pembrolizumab + Lenvatinib	NCT03006926	1	Safety/OR/D OR	
PD-1 and TKI		Camrelizumab +Apatinib	NCT02942329	1/2	OS	
PD-1 and TKI		Spartalizumab + Sorafenib	NCT02988440	1	Safety	
PD-1 and c-MET inhibitor		Spartalizumab +/- Capmatinib (INC280)	NCT02795429	1/2	Safety/ORR	
PD-1 and anti-TGF-β		Spartalizumab +/- NIS793	NCT02947165	1	Safety	
PD-1 and FGFR4 inhibitor		Spartalizumab +/- FGF401	NCT02325739	1/2	Safety/TTP/ ORR	
PD-1 and TKI		Nivolumab +/- Lenvatinib	NCT03418922	1	Safety	
PD-1 and TKI		Nivolumab + Cabozatinib	NCT03299946	1	Safety/Completion	
PD-1 and anti-VEGF		Nivolumab + Bevacizumab	NCT03382886	1	Safety	
PD-1 and TKI		Pembrolizumab + Regorafenib	NCT03347292	1	Safety	
PD-1 and TKI		Pembrolizumab + Sorafenib	NCT03211416	1/2	ORR	

PD-L1 and TKI	Avelumab + Axitinib	NCT03289533	1	Safety
PD-L1 and DNMT inhibitor	Durvalumab + Guadecitabine	NCT03257761	1	Safety/ORR
CTLA-4, PD-1 and anti-OX40	Nivolumab + INCAGN01949 vs. Ipilimumab + INCAGN01949 vs. Nivolumab + Ipilimumab + INCAGN01949	NCT03241173	1/2	Safety/ORR
PD-1 and antiphosphatidyl-serine	Pembrolizumab + Bavituximab	NCT03519997	2	ORR
Combination with local therapies				
PD-1 and ischemia	Nivolumab + TACE	NCT03143270	1	Safety
PD-1 and radiation	Pembrolizumab + TACE	NCT03397654	1/2	Safety
PD-1 and radiation	Nivolumab + Y90	NCT03033446	2	ORR
CTLA-4, PD-L1 and ischemia	Tremelimumab + Durvalumab + Radiation	NCT03482102	2	ORR
PD-1 and HSV oncolytic virus	Pembrolizumab +/- Talimogene Laherparepvec (T-VEC)	NCT2509507	1	Safety/ORR

Table (2): Undergoing major trials of ICPIs in HCC treatment (22).