

Selective cytotoxicity of single and dual anti-CD19 and anti-CD138 chimeric antigen receptor-natural killer cells against hematologic malignancies

Sudjit Luanpitpong,^{1*} Jirarat Poohadsuan,¹ Phatchanat Klaihmon,¹ Surapol Issaragrisil^{1,2,3}

¹Siriraj Center of Excellence for Stem Cell Research, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand

²Division of Hematology, Department of Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand

³Bangkok Hematology Center, Wattanosoth Hospital, BDMS Center of Excellence for Cancer, Bangkok, Thailand

Correspondence: Sudjit Luanpitpong, Siriraj Center of Excellence for Stem Cell Research, Faculty of Medicine Siriraj Hospital, Mahidol University, 2 Siriraj Hospital, Bangkoknoi, Bangkok 10700, Thailand; Tel.: +66 2 419 2907; Email: suidjit@gmail.com.

Supplementary information: Supplementary materials include Supplementary Table S1.

Supplementary Table S1. Efficacy of various CAR-NK-92 cells targeting CD19 or CD138 tumor antigen.

CAR design (generation)	Type of effector (E) NK-92 cells	Transduction / transfection efficiency	Type of target (T) cells	E:T ratio (incubation time)	Detection of cytotoxicity	Efficacy of CAR-NK-92 cells (vs control)	References
CAR-NK-92 cells targeting CD19							
scFv-CD28-4-1BB-CD3 ζ (3 rd gen)	NK-92	F(ab') ₂ >80%	K562 (negative)	1:5 (4 h)	Annexin V+ (Annexin V/7-AAD)	25.24 \pm 0.71% (vs 30.19 \pm 3.31)	Current study
scFv-CD3 ζ (1 st gen)		Myc-tagged CAR N/A%		1:1 (4 h)	PI+	Approx. 15% (vs 10%)	[1]
scFv-CD3 ζ (1 st gen)		F(ab') ₂ approx. 50%		5:1 (4 h)	PI+	61.7 \pm 4.4% (vs 66.1 \pm 0.1%)	[2]
scFv-CD28-4-1BB-CD3 ζ (3 rd gen)	NK-92	F(ab') ₂ >80%	Raji (CD19)	1:5 (4 h)	Annexin V+ (Annexin V/7-AAD)	80.99 \pm 4.14% (vs 64.12 \pm 9.26)*	Current study
scFv-CD3 ζ (1 st gen)		F(ab') ₂ >95%		2.5:1 (4 h)	PI+	Approx. 80% (vs 45%)	[3]
scFv-CD3 ζ (1 st gen)		scFv 95%		1:4 (24h)	Annexin V+ (Annexin V/7-AAD)	Approx. 45% (vs 15%)**	[4]
scFv-CD28 -CD3 ζ (2 nd gen)		Myc-tagged CAR N/A%		1:1 (2 h)	PI+	Approx. 60% (vs 10%)*	[5]
scFv-CD137- CD3 ζ (2 nd gen)				1:1 (6 h)		Approx. 45% (vs 20%)*	
scFv-CD28-4-1BB-CD3 ζ (3 rd gen)	NK-92	F(ab') ₂ >80%	H929 (CD138)	1:5 (4 h)	Annexin V+ (Annexin V/7-AAD)	28.28 \pm 4.17% (vs 36.30 \pm 2.87)	Current study
scFv-CD28-4-1BB-CD3 ζ (3 rd gen)	NK-92	F(ab') ₂ >80%	RPMI-8226 (CD138)	1:5 (4 h)	Annexin V+ (Annexin V/7-AAD)	39.9 \pm 4.30% (vs 33.32 \pm 6.92)	Current study

scFv-CD28-4-1BB-CD3 ζ (3 rd gen)	NK-92	F(ab') ₂ >80%	REH (CD19 and CD138)	1:5 (4 h)	Annexin V+ (Annexin V/7-AAD)	65.24 \pm 2.69% (vs 5.83 \pm 1.76)**	Current study
scFv-CD3 ζ (1 st gen)		F(ab') ₂ approx. 50%		5:1 (4 h)	PI+	76.3 \pm 4.7% (vs 15%)**	[2]
scFv-CD3 ζ (1 st gen)		Myc-tagged CAR N/A%		1:1 (4 h)	PI+	Approx. 15% (vs 0%)**	[1]
CAR-NK-92 cells targeting CD138							
scFv-CD28-4-1BB-CD3 ζ (3 rd gen)	NK-92	F(ab') ₂ >80%	K562 (negative)	1:5 (4 h)	Annexin V+ (Annexin V/7-AAD)	32.25 \pm 2.47% (vs 30.19 \pm 3.31)	Current study
scFv-CD3 ζ (1 st gen)	NK-92MI	EGFP-tagged >95%		1:1 (4 h)	Annexin V+ (Annexin V/PI)	Approx. 60% (vs 55%)	[6]
scFv-CD28-4-1BB-CD3 ζ (3 rd gen)	NK-92	F(ab') ₂ >80%	Raji (CD19)	1:5 (4 h)	Annexin V+ (Annexin V/7-AAD)	63.20 \pm 1.27% (vs 64.12 \pm 9.26)	Current study
scFv-CD28-4-1BB-CD3 ζ (3 rd gen)	NK-92	F(ab') ₂ >80%	H929 (CD138)	1:5 (4 h)	Annexin V+ (Annexin V/7-AAD)	61.28 \pm 0.05% (vs 36.30 \pm 2.87)**	Current study
scFv-CD3 ζ (1 st gen)	NK-92MI	EGFP-tagged CAR >95%		1:1 (4 h)	Annexin V+ (Annexin V/PI)	Approx. 40% (vs 20%)**	[6]
scFv-CD28-4-1BB-CD3 ζ (3 rd gen)	NK-92	F(ab') ₂ >80%	RPMI-8226 (CD138)	1:5 (4 h)	Annexin V+ (Annexin V/7-AAD)	57.46 \pm 1.88% (vs 33.32 \pm 6.92)**	Current study
scFv-CD3 ζ (1 st gen)	NK-92MI	EGFP-tagged >95%		1:1 (4 h)	Annexin V+ (Annexin V/PI)	Approx. 30% (vs 15%)*	[6]
scFv-CD28-CD3 ζ (2 nd gen)		Fc 99.9%		1:4 (6 h)	7-AAD+	Approx. 45% (vs 25%)	[7]
scFv-CD28-4-1BB-CD3 ζ (3 rd gen)	NK-92	F(ab') ₂ >80%	REH (CD19 and CD138)	1:5 (4 h)	Annexin V+ (Annexin V/7-AAD)	18.45 \pm 1.64% (vs 5.83 \pm 1.76)**	Current study
CAR-NK-92 cells targeting CD19 and CD138 – Data from other studies are not available.							

*p < 0.05, **p < 0.01 versus control in the same study. Abbreviation: PI, propidium iodide.

References

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