

Table. Additional file 1**Additional file 1. Freezing programs**

Advanced Therapy Products	Controlled rate freezer	GMP Laboratories
NFAH	30 min on ice	UPRC Seville
	24°C at -20°C	
	48°C at -80°C	
	Transfer to -196°C	
BM-MSCs	Wait at 4°C	HURS Cordoba
	Ramp 0.1°C min ⁻¹ until Chamber = 2°C	
	Ramp 1°C min ⁻¹ until Chamber = -10°C	
	Ramp 71°C min ⁻¹ until Chamber = -60°C*	
	Ramp 25°C min ⁻¹ until Chamber = -20°C	
	Ramp 0.2°C min ⁻¹ until Chamber = -21°C	
	Ramp 1.2°C min ⁻¹ until Chamber = 50°C	
	Ramp 7°C min ⁻¹ until Chamber = -120°C	
	Transfer to -196°C	

*This step induces extracellular ice nucleation near the freezing point of the cryoprotective solution (-10°C)

NFAH: cellularized nanostructured fibrin agarose hydrogel; BM-MSCs: bone marrow-derived mesenchymal stromal cells; UPRC: Unidad de Producción y Reprogramación Celular; HURS: Hospital Reina Sofía