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Specific microRNAs regulate dental pulp stem cells behavior: A Systematic Review

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MicroRNAs (miRNAs), small non-coding RNA, control the translation of messenger RNAs into proteins. miRNAs have a crucial role in regulating the diverse biological processes of many physiological and pathological activities. miRNAs have shown to modulate the stemness and differentiation of various mesenchymal stem cells. The miRNAs in dental pulp stem cells (DPSCs) have been demonstrated to regulate the levels of proteins crucial for DPSC proliferation and differentiation. The present systematic review describes the functions of miRNAs, focusing on the roles of miRNAs in regulating stemness maintenance and differentiation. Furthermore, the functions of miRNAs in DPSCs cell proliferation and differentiation were reviewed. DPSC miRNA expression profiles compared with other cell types was described. The roles of miRNAs in dental pulp inflammation were also discussed.

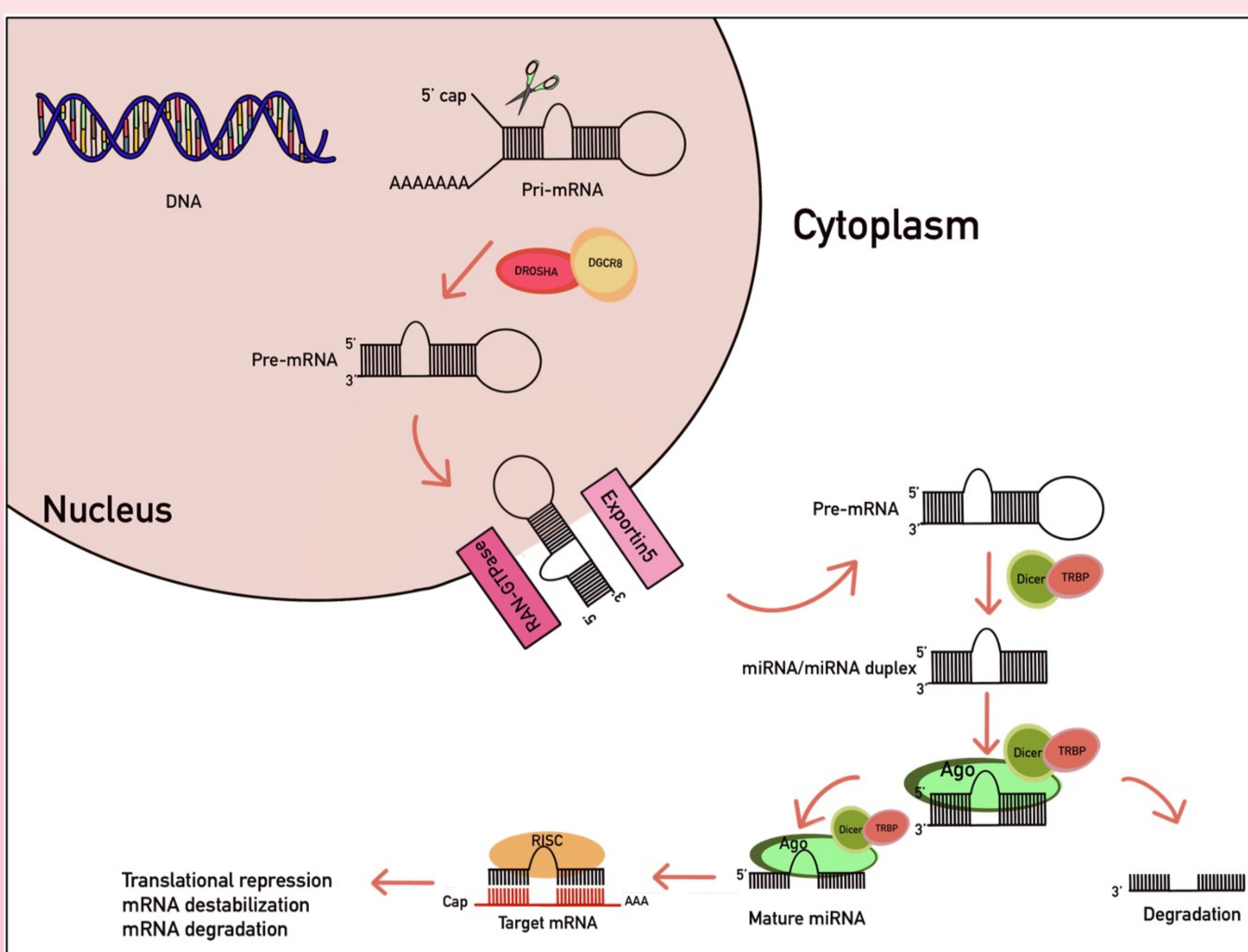


Figure 1 Biogenesis of microRNAs

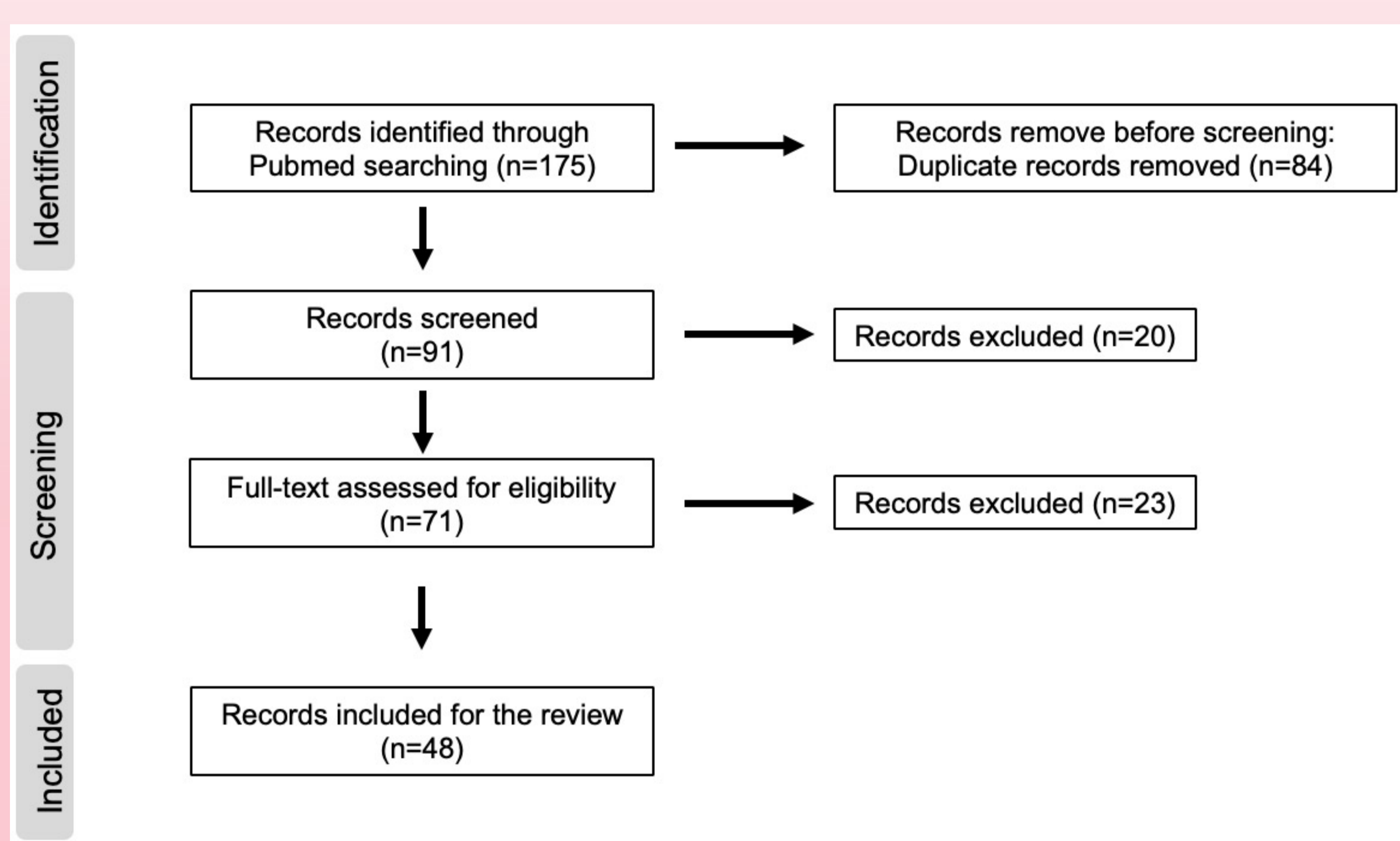


Figure 2 Flow chart of studies selection

Table 1 miRNA regulating cell proliferation of DPSCs or DPs

Function	miRNA	Target	Reference
Promotion of cell proliferation	miR-140-5p	TLR4	Sun et al., 2017
	miR-720	DNMT3A, DNMT3B	Hara et al., 2013
Inhibition of cell proliferation	miR-146a-5p	NOTCH1	Qiu et al., 2019
	miR-152	SIRT7	Gu et al., 2016
	miR-224-5p	n/a	Ke et al., 2019
	miR-584	TAZ	Tian et al., 2020

Table 2 miRNA regulating osteogenic and odontogenic differentiation of DPSCs or DPs

Function	miRNA	Target	Reference
Promoting differentiation	miR-27a-5p	LTBP1	Hu et al., 2019
	miR-125a-3p	Fyn	Wang et al., 2020
	miR-146a-5p	NOTCH1	Qiu et al., 2019
	miR-223	Smad3	Huang et al., 2019
	miR-675	DLX3	Zeng et al., 2018
	miR-720	DNMT3A, DNMT3B	Hara et al., 2013
	miR-3065	Bmpr2	Lin et al., 2018
Inhibiting differentiation	miR-135b	Smad4, Smad5	Song et al., 2017
	miR-140-5p	TLR4	Sun et al., 2017
		WNT1	Lu et al., 2019
	miR-143	TNF- α	Zhang et al., 2018
	miR-143-5p	MAPK1	Wang et al., 2019
	miR-215	HspB8	Yao et al., 2019
	miR-219a-1-3p	HspB8	Yao et al., 2019
	miR-295-5p	HspB8	Yao et al., 2019
miR-488	MAPK1	Yu et al., 2019	
miR-508-5p	GPNMB	Liu et al., 2019	