The importance of flow shear stress (SS) on the differentiation of endothelial progenitor cells (EPCs) has been demonstrated in various studies. Cholesterol retention and MicroRNA regulation have been also proposed as relevant factors involved in this process, though evidence regarding their regulatory roles in the differentiation of EPCs is currently lacking.

In a study Li et al. on high shear stress (HSS)-induced differentiation of EPCs, they investigated the importance of ABCA1, an important regulator in cholesterol efflux, and miR-25-5p, a potential regulator of endothelial reconstruction. They first revealed an inverse correlation between miR-25-5p and ABCA1 expression levels in EPCs under HSS treatment; their direct interaction was subsequently validated by a dual luciferase reporter assay. Further studies using flow cytometry and qPCR demonstrated that both miR-25-5p overexpression and ABCA1 inhibition led to elevated levels of specific markers of endothelial cells (ECs), with concomitant down-regulation of smooth muscle cell (SMC) markers. Finally, knockdown of ABCA1 in EPCs significantly promoted tube formation, which confirmed the conjecture. This current results suggest that miR-25-5p might regulate the differentiation of EPCs partially through targeting ABCA1, and such a mechanism might account for HSS-induced differentiation of EPCs [1].

1)
Li Z, Li JN, Li Q, Liu C, Zhou LH, Zhang Q, Xu Y. miR-25-5p regulates endothelial progenitor cell differentiation in response to shear stress through targeting ABCA1. Cell Biol Int. 2021 May 4. doi: 10.1002/cbin.11621. Epub ahead of print. PMID: 33945659.