

Table 4. Summary of published studies evaluating microRNA expression in human cumulus cells (not PCOS patients) in relation to oocyte competence, ovarian reserve, and embryo development. Reported microRNAs, analytical methods, and clinical contexts vary considerably across studies, reflecting methodological heterogeneity in this field.

Author (Year)	miRNAs	Method	Clinical / Biological Context
Karakaya (2012) [17]	miR-21, miR-320	Microarray+ qPCR	Diminished oocyte number in IVF
Velthut-Meikas (2013) [35]	miR-21-5p, miR-146b-5p, let-7 family	Small RNA-seq	Granulosa/cumulus gene regulation
Assou (2013) [5]	let-7, miR-21, miR-146b	Deep sequencing + qPCR	Regulation of cumulus–oocyte complex
Al-Edani (2014) [1]	miR-202, miR-210, miR-424	Microarray + qPCR	Aging-related cumulus changes
Tong (2014) [33]	let-7 family, miR-320a	qPCR	Cumulus vs corona radiata profiles
Karakaya (2015) [18]	miR-21-5p	Microarray + qPCR	Poor ovarian response
Chen (2017) [9]	let-7 family, miR-342-3p	Sequencing+ qPCR	Diminished ovarian reserve
Andrei (2018) [4]	miR-146a-5p, miR-149-5p	NGS + qPCR	Differential granulosa/cumulus profiles
Yerushalmi (2018) [45]	let-7 family, miR-21, miR-34a	Nanostring + qPCR	Ovulatory cascade regulation
Woo (2018) [38]	Multiple miRNAs	Small RNA-seq	Diminished ovarian reserve
Cui (2018) [10]	miR-145-5p	Microarray + qPCR	Oocyte maturation & CC viability
Bartolucci (2020) [8]	miR-21-5p	qPCR	Blastocyst developmental potential
Vigo (2021) [36]	Multiple miRNAs	PCR array	LH stimulation protocol effects
Da Silva (2021) [11]	miR-532-3p	qPCR	Endometriosis-associated infertility
Almiñana (2025) [2]	miR-143-3p, miR-10b-5p	RNA-seq	Endometriosis-related miRNA alterations
Kılıç (2025) [20]	miR-17, miR-106b	qPCR	Oocyte maturation markers