



MICRORNAS IN BIOLOGICAL FLUIDS AND PERI-IMPLANT TISSUES AS POTENTIAL BIOMARKERS FOR THE DIAGNOSIS OF PERI-IMPLANT DISEASES: A SYSTEMATIC REVIEW

Ramos-Zambrana C, Kubasiewicz-Ross P, Sanmartí-García G, Rui Figueiredo, Camps-Font O, Toledano-Serrabona J, Sánchez-Torres A, Sánchez-Garcés MA, Valmaseda-Castellón E.
Facultat de Medicina i Ciències de la Salut, Universitat de Barcelona, Spain

INTRODUCTION: Peri-implant diseases, including peri-implant mucositis and peri-implantitis, are inflammatory conditions that may compromise the long-term survival of dental implants. Diagnosis relies mainly on clinical and radiographic parameters, and peri-implantitis may not be detected until significant bone loss has occurred.

MicroRNAs (miRNAs) are small non-coding RNAs involved in inflammatory, immune, and bone-remodeling processes. Their differential expression in **peri-implant biological fluids and tissues** supports their potential as diagnostic biomarkers for peri-implant diseases.

AIM

To evaluate the potential of microRNAs (miRNAs) in biological fluids and peri-implant tissues as diagnostic biomarkers for peri-implant diseases.

MATERIALS AND METHODS

Study Design:
Systematic review
PRISMA 2020 ·
Cochrane guidance

PICO: **P:** Adults >18 years,
I: miRNA expression, **C:**
Healthy vs. diseased peri-
implant sites, **O:** Diagnostic
potential

Literature search:
4 databases
PubMed/MEDLINE ·
Cochrane Library · Web
of Science · Scopus

Study selection:
Identification →
Screening →
Eligibility → Inclusion

Data Extraction:
Biological samples ·
miRNAs · Clinical and
radiographic parameters ·
Diagnostic potential

Quality assessments:
Newcastle–Ottawa
Scale (NOS) and
QUADAS-2

RESULTS

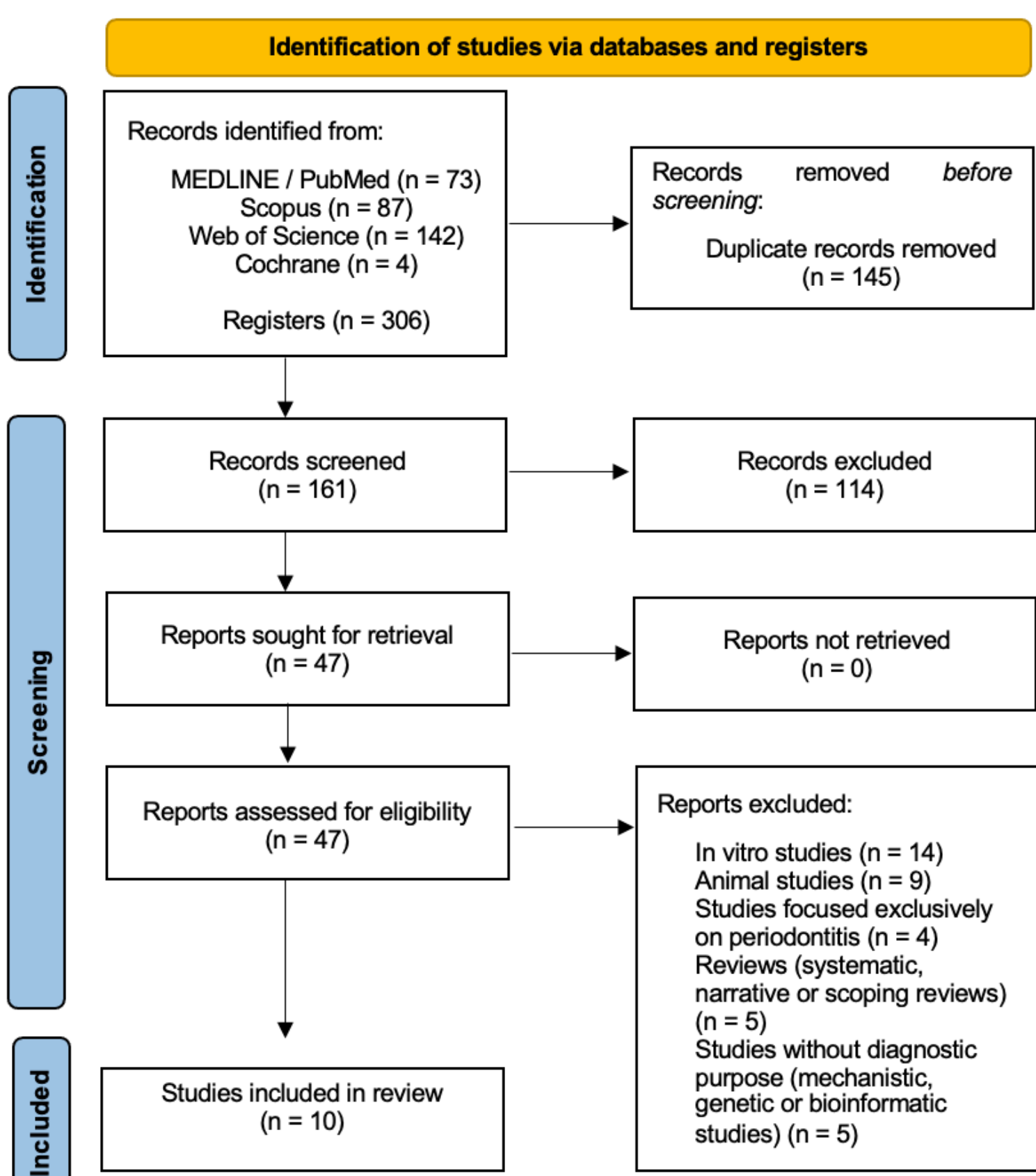


Figure 1. PRISMA 2020 flow diagram of the study selection process.

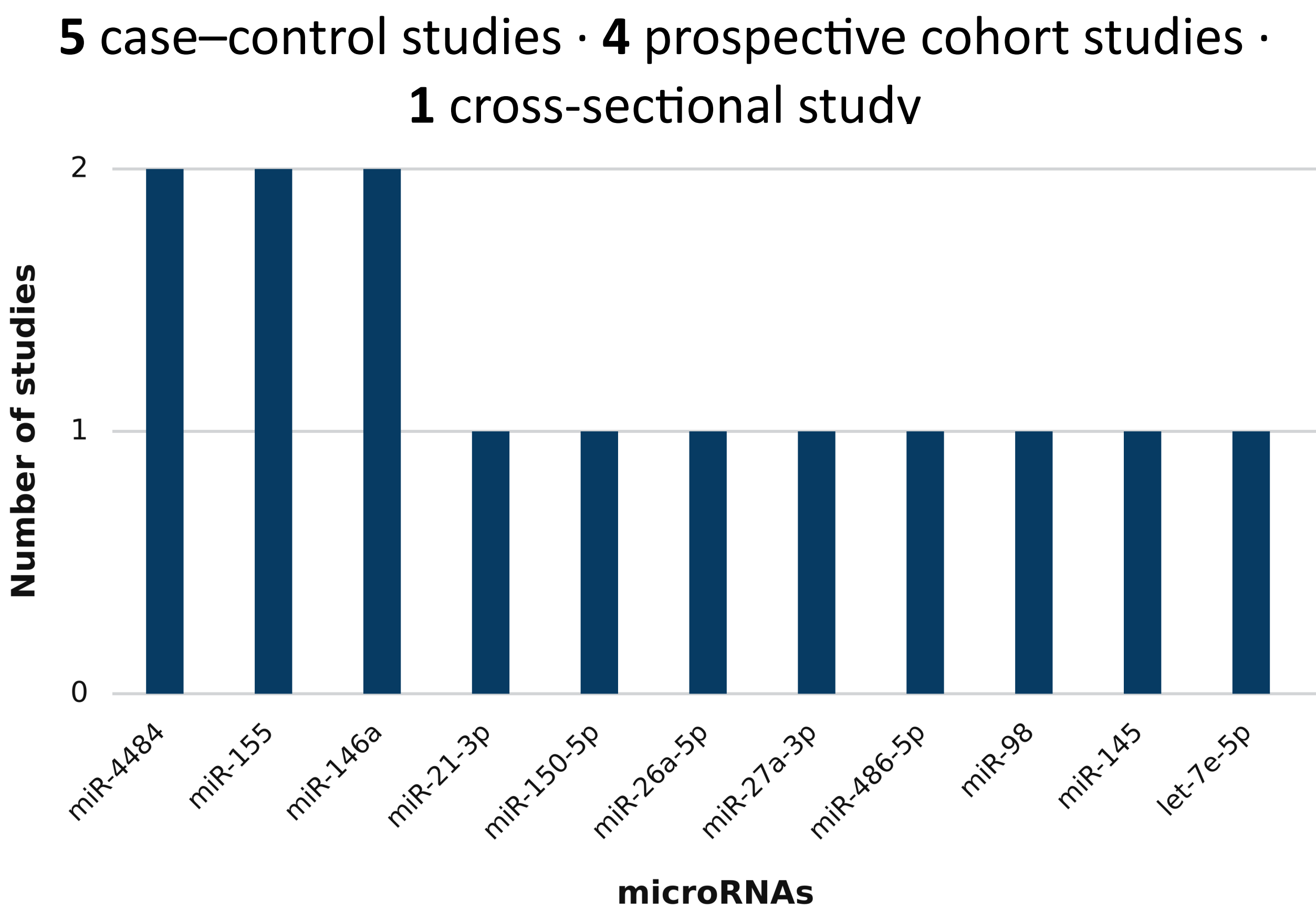


Figure 2. Frequency of miRNAs investigated in the included studies.

Samples: **peri-implant crevicular fluid (PICF)** ·
peri-implant tissue · saliva · serum
Main techniques: **qRT-PCR** · **microarray analysis**

Differential **miRNA expression** was observed between healthy peri-implant sites and sites affected by **peri-implant mucositis or peri-implantitis**.

Selected **miRNAs** were associated with **clinical and radiographic parameters**, supporting their potential diagnostic value.

DISCUSSION

STUDY (YEAR) · SAMPLE	microRNAs	CLINICAL ASSOCIATIONS
Hamed et al. (2024) / Fu et al. (2025) TISSUE	miR-155 / miR-146a	Bleeding on probing
Lei et al. (2025) TISSUE	↑ miR-486-5p	Probing depth · Clinical attachment loss
Zainal et al. (2025) PICF	↑ let-7e-5p	Probing depth · Marginal bone loss
Chaparro et al. (2021) PICF	↓ miR-21-3p and miR-150-5p	Health vs. disease
Menini et al. (2019, 2021) TISSUE AND PICF	miRNA signature	Bone resorption
Urvaszoglu et al. (2021, 2024) SALIVA	↓ miR-4484	Conventional clinical parameters

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Scan to access the full reference list.

