



# Next Generation Oncogenic microRNAs Inhibitors for Cancer Therapeutics

Anisha Gupta, Ph.D.<sup>1\*</sup>, Faria Iqbal, Pharm.D<sup>1</sup>, Karishma Dhuri<sup>2</sup>, Raman Bahal, Ph.D.<sup>2</sup>

UNIVERSITY OF SAINT JOSEPH  
SCHOOL OF PHARMACY  
& PA STUDIES

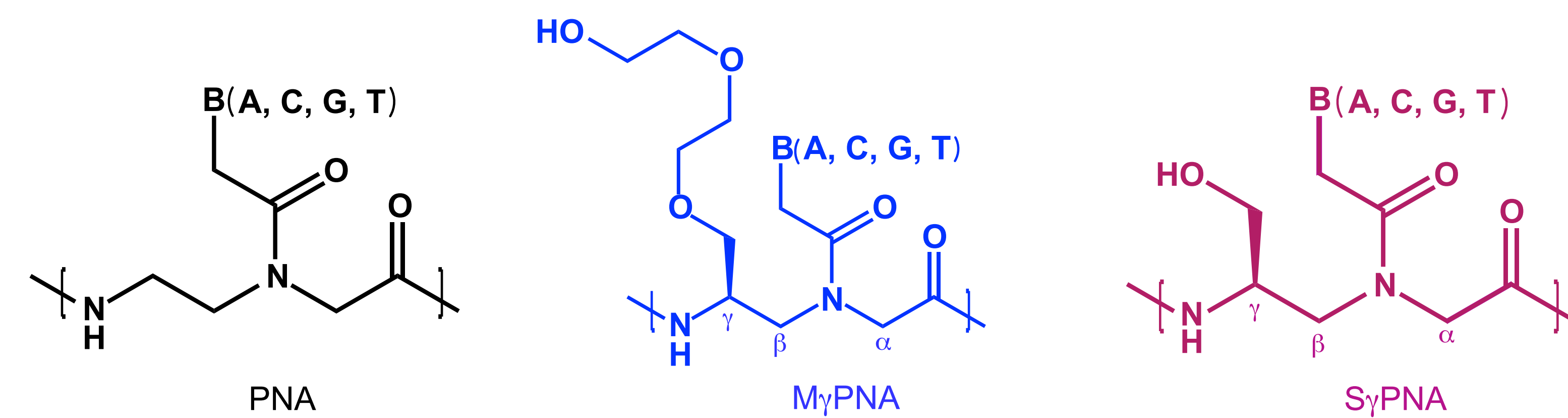
<sup>1</sup>Department of Pharmaceutical Sciences, University of Saint Joseph, CT, USA

<sup>2</sup>Department of Pharmaceutical Sciences, University of Connecticut, CT, USA

## ABSTRACT

- MicroRNAs (miRs) are non-coding RNA (18-23nt in length) that are involved in the post-transcriptional regulation of messenger RNA (mRNA) and regulation of gene expression.
- Cancer-causing miRs are also known as oncomiRs.
- OncomiRs bind to the mRNA and repress its expression, resulting in uncontrolled cell division.
- miRNA-155 (miR-155) and miR-17-92 are overexpressed in various types of lymphomas and leukemias, suggesting that targeting these oncomiRs could be a potential platform for developing precision medicine.

## DESIGN AND OLIGOMER SEQUENCES



miR 155 5'-----UUA AUGCUAAUCGUGAUAGGGGUU-3'

PNA 1 5'-----AGCATTAA-OOO-C-----3'

MyPNA 2 5'-----AGCATTAA-OOO-C-----3'

SyPNA 3 5'-----AGCATTAA-OOO-C-----3'

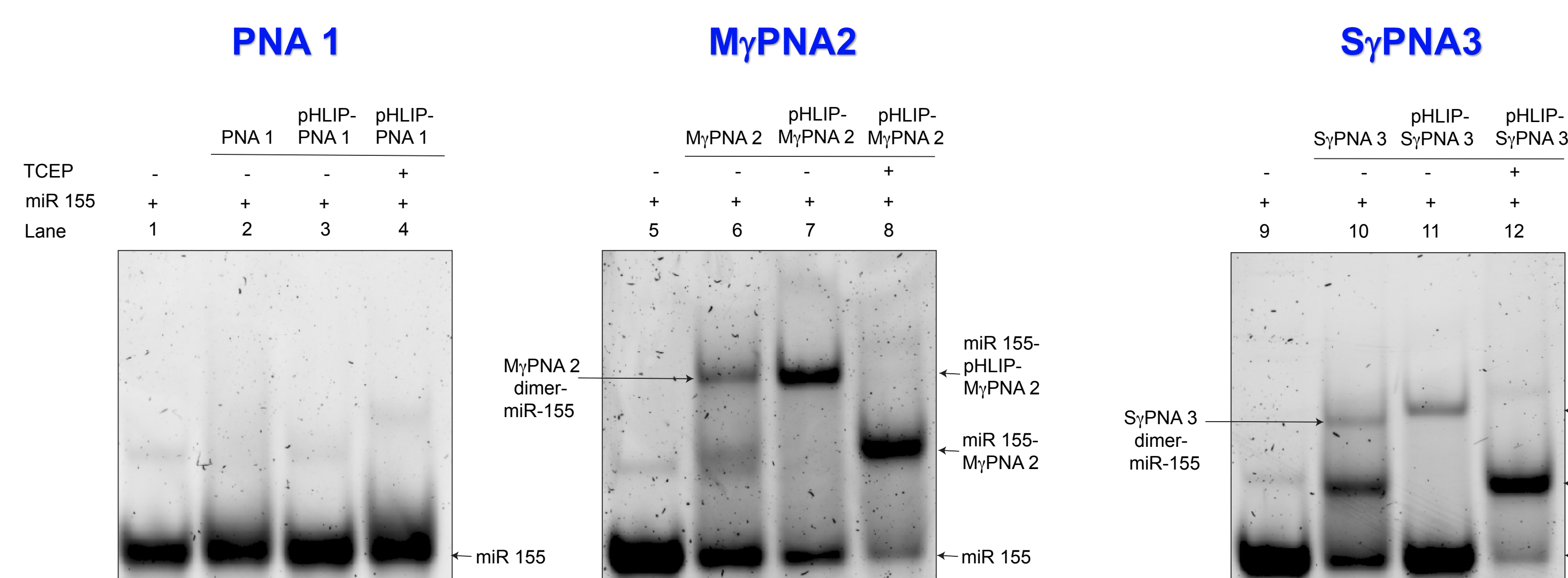
Scr-SyPNA 4 5'-----ATAGATAC-OOO-C-----3'

PNA T5 5'-----Tam-OOO---AGCATTAA-OOO-C-----3'

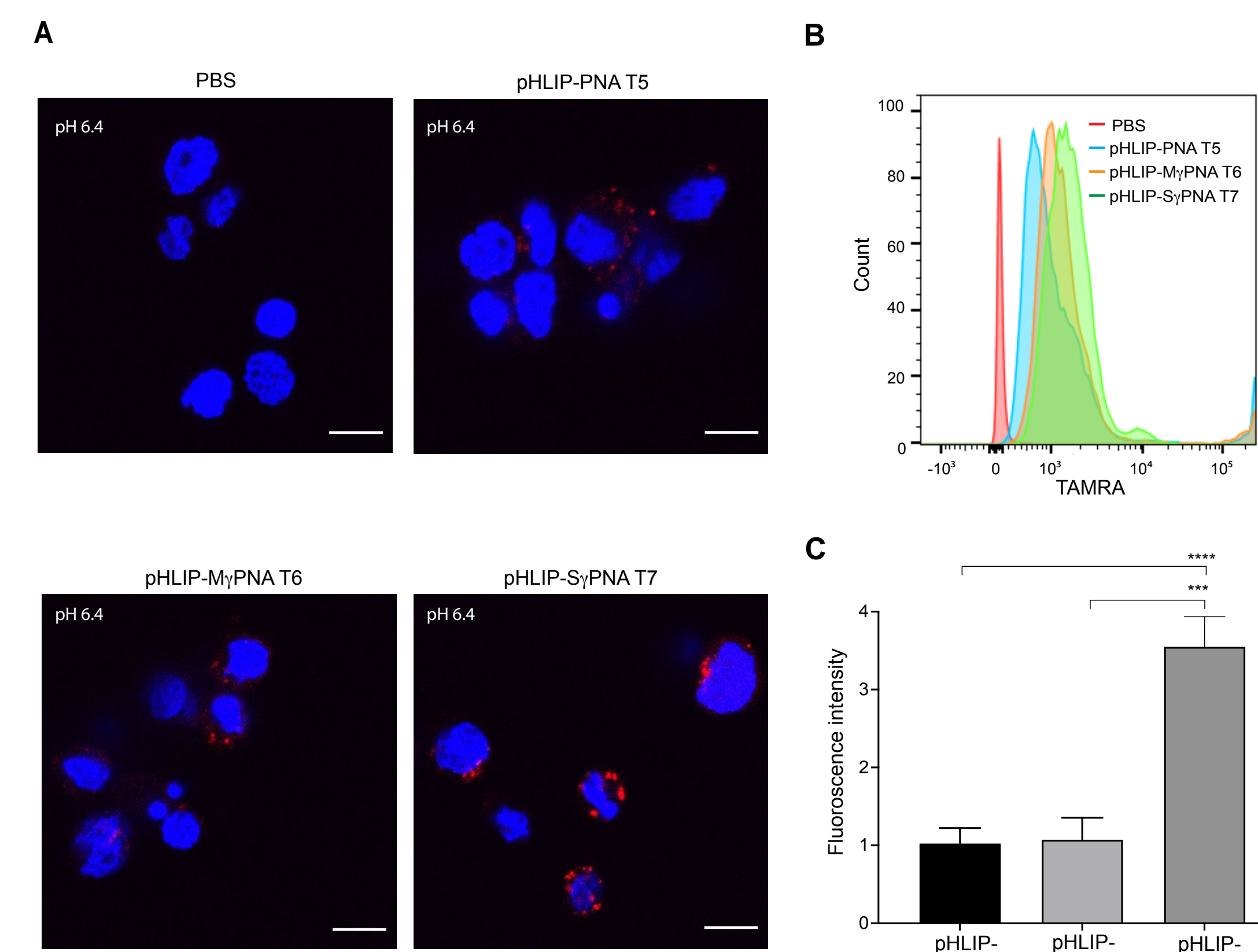
MyPNA T6 5'-----Tam-OOO---AGCATTAA-OOO-C-----3'

SyPNA T7 5'-----Tam-OOO---AGCATTAA-OOO-C-----3'

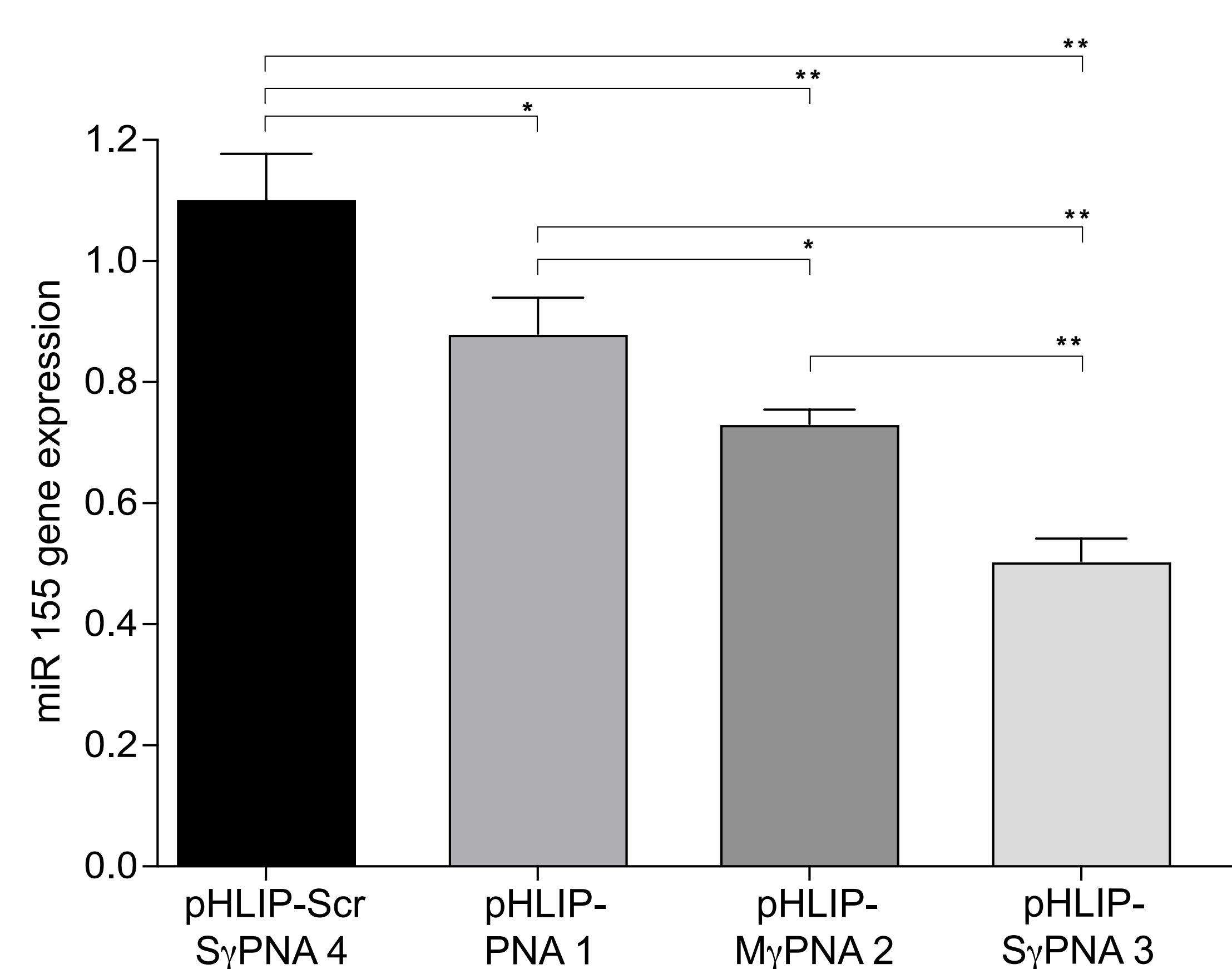
## GEL SHIFT BINDING ASSAY



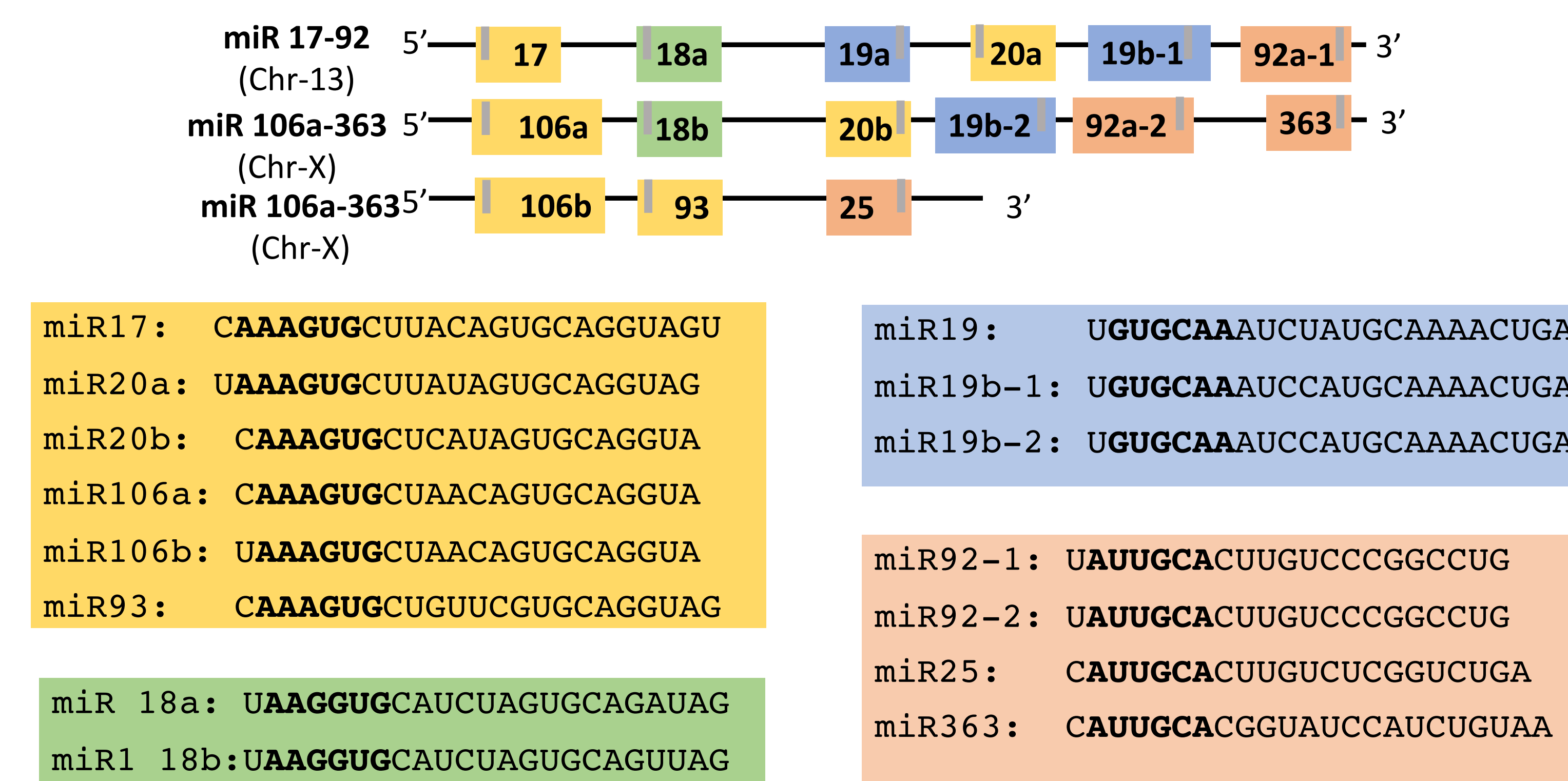
## CELLULAR UPTAKE STUDIES



## miR-155 GENE EXPRESSION ANALYSIS



## miR-17-92 TARGET CLUSTER SEQUENCES

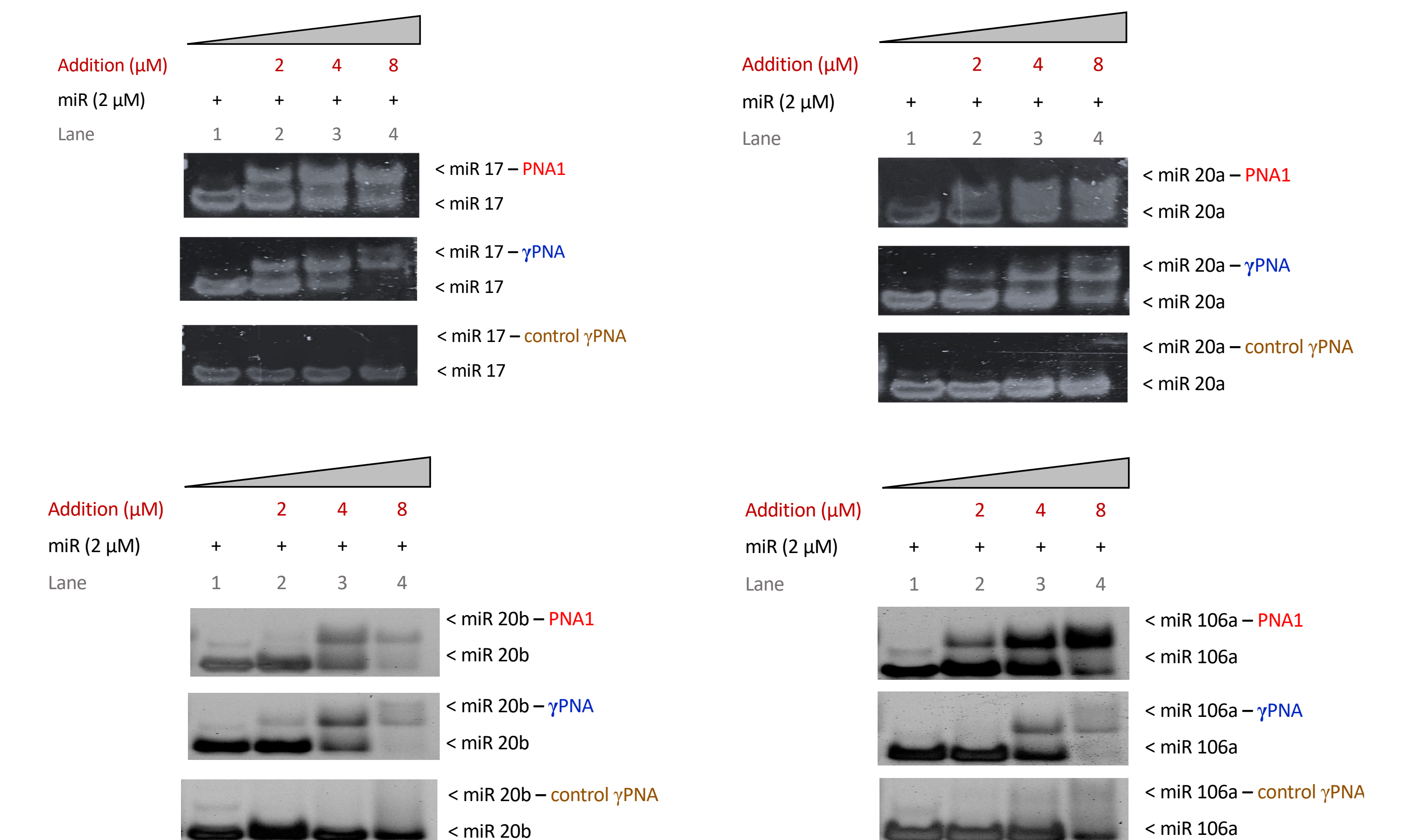


## miR-17-92 – OLIGOMER SEQUENCE

miR-17: CAAAGUGCUUACAGUGCAGGUAGU  
 miR-20a: UAAAGUGCUUAUAGUGCAGGUAG  
 miR-20b: CAAAGUGCUCAUAGUGCAGGUA  
 miR-106a: CAAAGUGCUAACAGUGCAGGUA  
 miR-106b: UAAAGUGCUAACAGUGCAGGUA  
 miR-93: CAAAGUGCUGUUCGUGCAGGUAG

PNA1: 3' -RR-TTTCACGA-RR-5'  
 γPNA1: 3' -RR-TTTCACGA-RR-5'  
 TAMRA-γPNA1: 3' -RR-TAMRA-TTTCACGA-RR-5'  
 Control PNA: 3' -RR-GTGTTGGA-RR-5'

## miR-17-92 – GEL SHIFT BINDING ASSAY



## CONCLUSIONS AND FUTURE WORK

- Confirmed binding to the miR-155 and miR-17-92 sequences.
- Established the uptake and target knockdown in the cell lines.
- Will perform functional viability assays in the cell lines.

## REFERENCES

Cheng CJ, Bahal R, et al. *Nature*, 2015.  
 Gupta A, et al. *Molecular Therapy Nucleic Acids*, 2017.  
 Pradeep SP, Malik S, et al. *RNA*, 2023.

## ACKNOWLEDGEMENTS

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