

MicroRNAs-involved regulatory network of ATRA- and Am80-induced human leukemia cell line HL-60 differentiation

Cheng-Pao Chen¹, Hsuan-Cheng Huang², and Hsueh-Fen Juan^{1,3*}

1. Institute of Molecular and Cellular Biology, National Taiwan University,
 2. Institute of Biomedical Informatics, National Yang-Ming University,
 3. Departments of Life Science, National Taiwan University, Taipei, Taiwan
- *email: yukijuan@ntu.edu.tw

All-trans retinoic acid (ATRA) and Am80, natural and synthetic derivatives of vitamin A, have been used in oncology for many years and are useful for inducing HL-60 to differentiate to granulocyte [1]. In this study, we showed that TGF- β signaling pathway is the most perturbed and involved in differentiation process using microarray and bioinformatics approach. With time-series gene expression profiles measured by the quantitative real-time PCR, we constructed a gene network of ATRA- and Am80-induced human leukemia cell line HL-60 differentiation. The results from comparative analysis of target genes indicated that this gene network was regulated by some candidate microRNAs. MicroRNAs are non-coding, single-stranded RNAs of 20 ~ 25 nucleotides that execute a gene regulator function responsible for cell growth, cell differentiation, disease, and cancer [2]. In our results, the expression of miR-96 and miR-107 were significantly induced by ATRA and Am80 (Figure 1). In summary, our results showed that miR-96 and miR-107 seem to be the regulators involved in the gene network of leukemia cell differentiation (Figure 2).

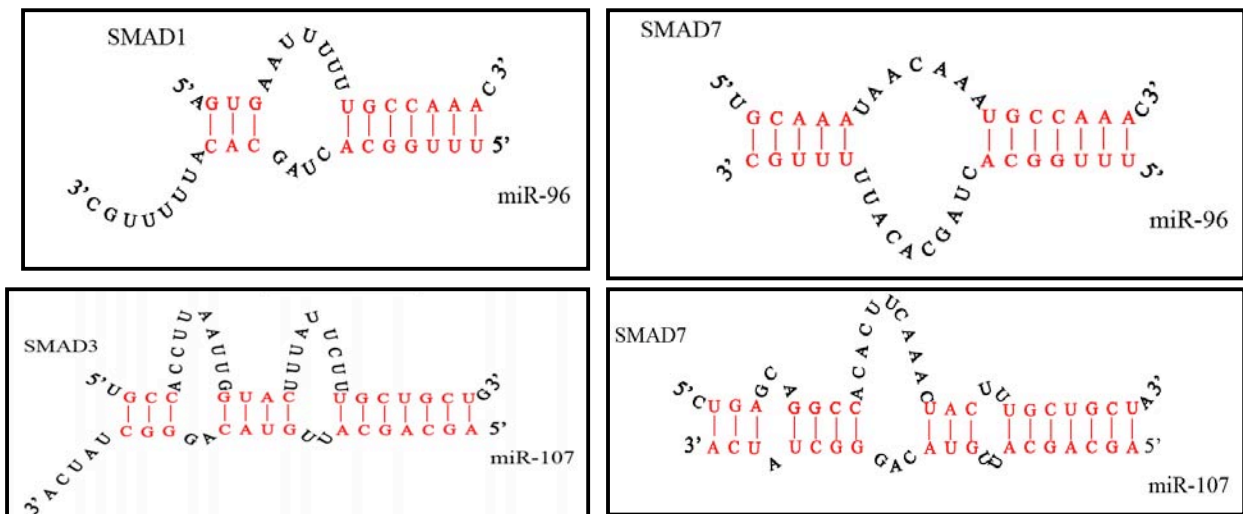


Figure 1: The sequence alignment of miR-96 and miR-107 with their target genes.

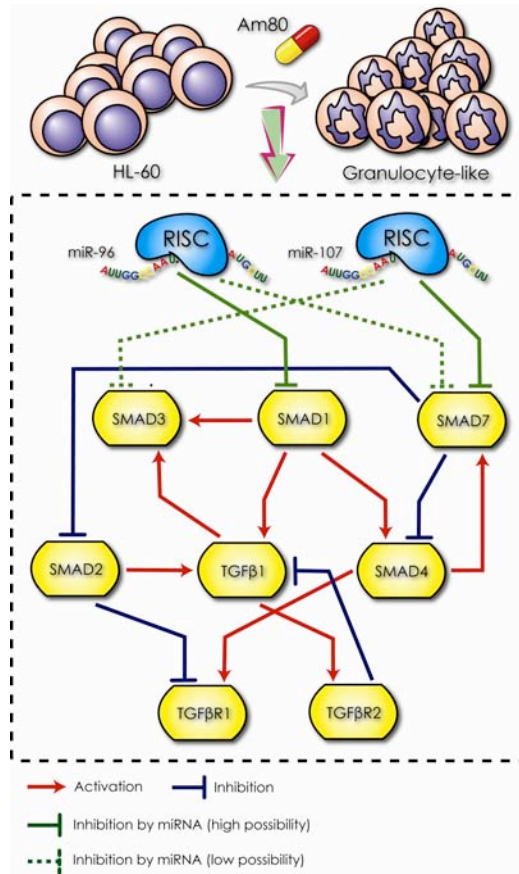


Figure 2: MicroRNA-involved regulatory network of ATRA- and Am80-induced human leukemia cell line HL-60 differentiation.

References

- [1] Takeuchi, M., *et al.* (1998). Relapsed acute promyelocytic leukemia previously treated with all-trans retinoic acid: clinical experience with a new synthetic retinoid, Am-80. *Leuk Lymphoma*, **31**, 441-451.
- [2] Esquela-Kerscher, A. and Slack, F.J. (2006). Oncomirs - microRNAs with a role in cancer. *Nat Rev Cancer*, **6**, 259-269.