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MicroRNAs in normal mammary gland development

Fabienne Le Provost

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MicroRNAs in Normal Mammary Gland Development

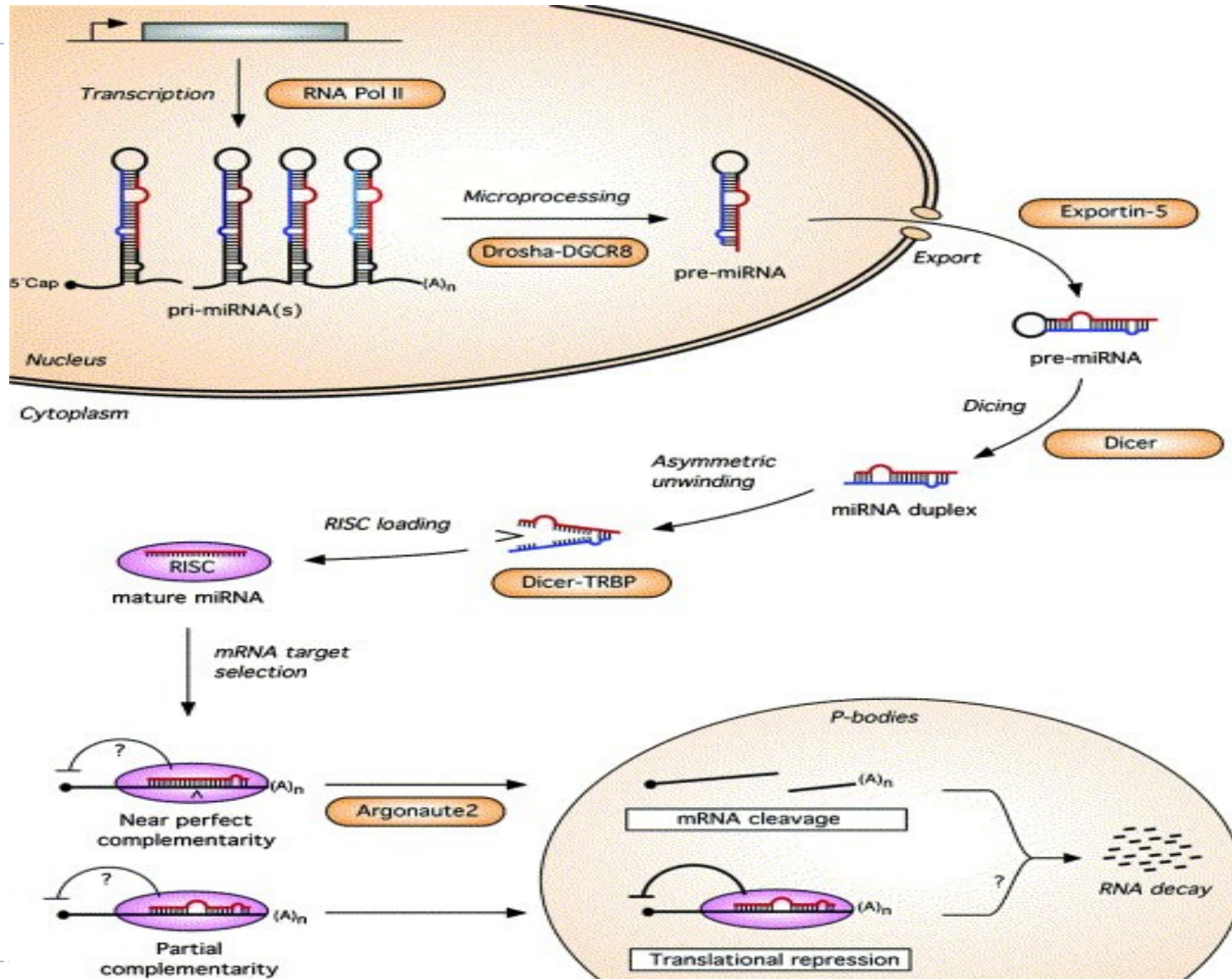
Fabienne LE PROVOST

Institut National de la Recherche Agronomique, Jouy-en-Josas, France

microRNA

- ▶ Small non-coding RNA, 18-22 nt
- ▶ Endogenous
- ▶ Conserved during evolution
- ▶ Expression : ubiquitous, tissue-specific
- ▶ Functions : post-transcriptionally regulate gene expression
 - potentially regulate 30% of protein-encoding genes
- ▶ Biological processes : developmental changes, tissue morphogenesis, cell growth, differentiation, apoptosis, metabolism,
 - also in diseases as diabetes cancer viral infection

microRNA biosynthesis



Cloning of new miRNA from normal mouse mammary gland

BMC Genomics



Research article

Open Access

From 455 sequences obtained from mammary gland (V8w, Gd2, Gd6, Gd18, Ld4, Id1), 24 new miRNAs have been identified.

Tissue expression profiles :
No miRNA mammary gland specific.

This article is available from: <http://www.biomedcentral.com/1471-2164/10/149>

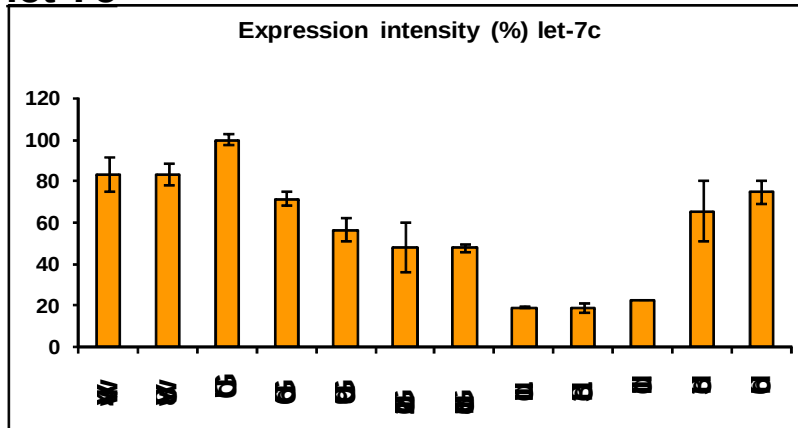
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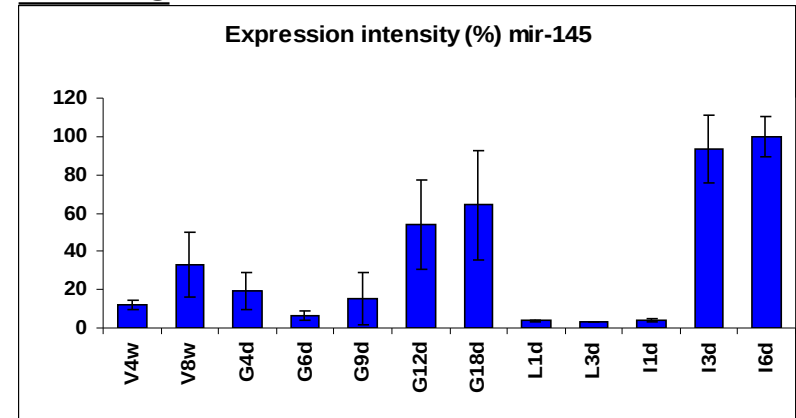
Abstract

miR expression profiles in mammary gland

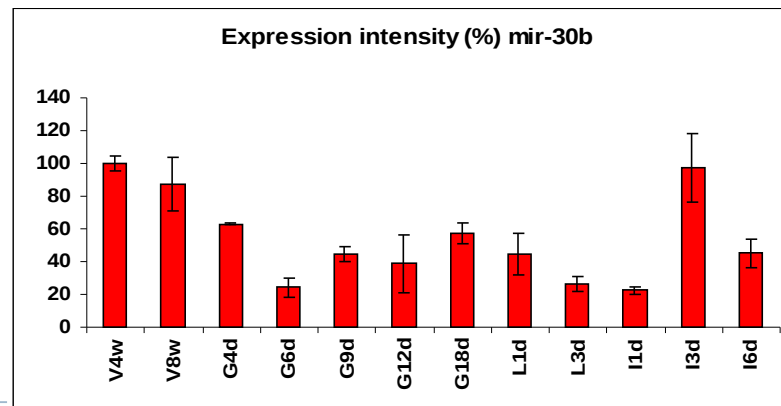
let-7c



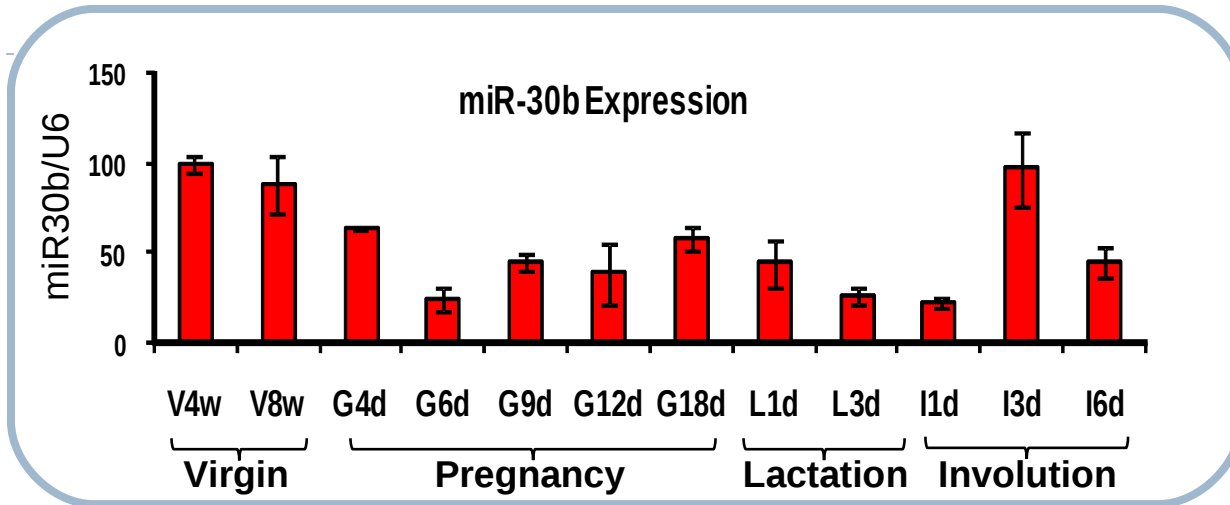
mir-145



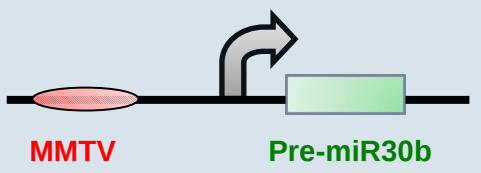
mir-30b



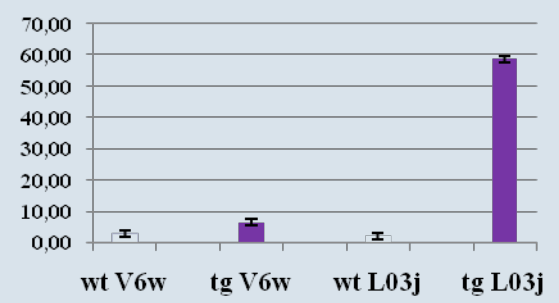
Role of miR-30b : over-expression



Mice over-expressing miR-30b precursor

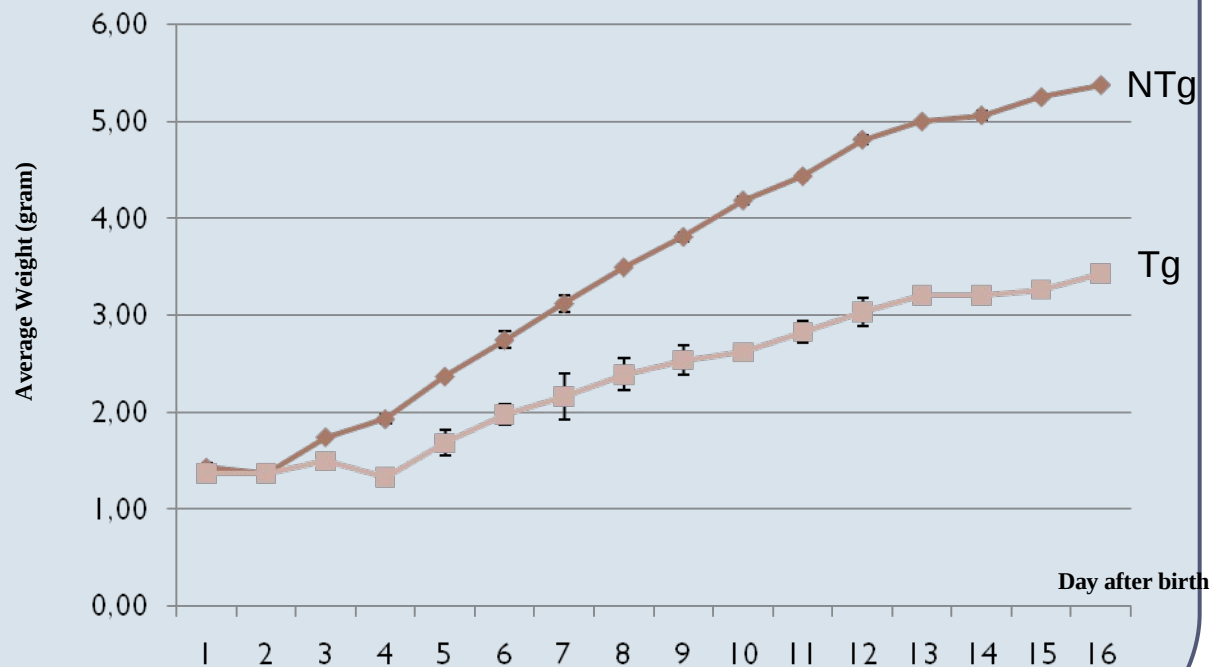


miR-30b expression in Tg mice



Role of miR-30b : over-expression

Growth curves of pups feeding by Transgenic (Tg) or Non-transgenic (NTg) dams



Role of miR-30b : over-expression

- ▶ Stages collected:
 - ▶ Virgin 6w, 13w
 - ▶ Pregnancy 6d, 14d, 18d
 - ▶ Lactation 3d, 12d
 - ▶ Involution 1d, 3d, 6d, 11d

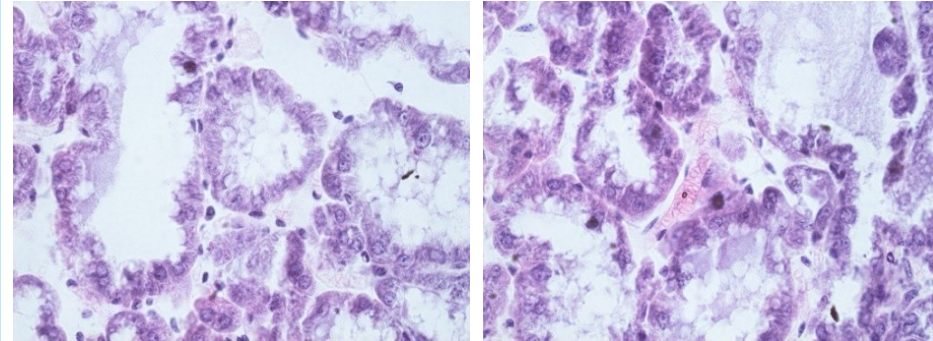
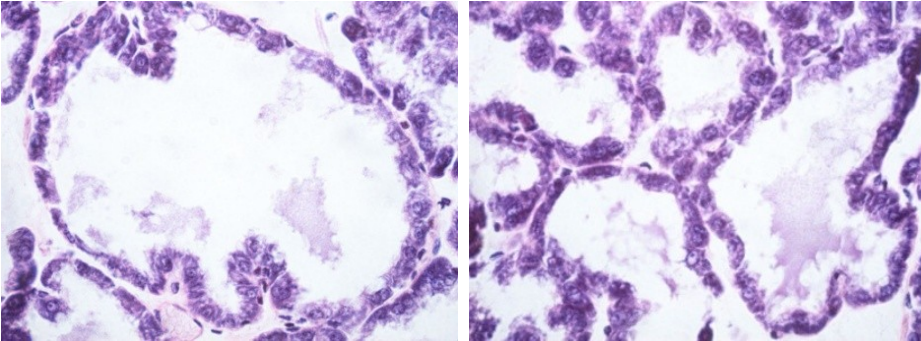
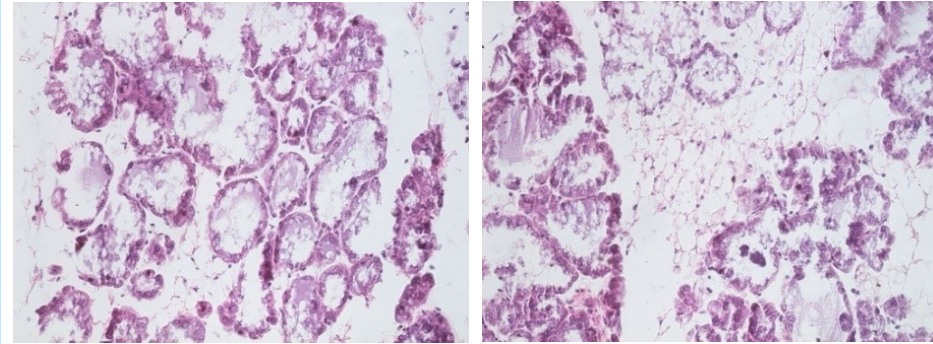
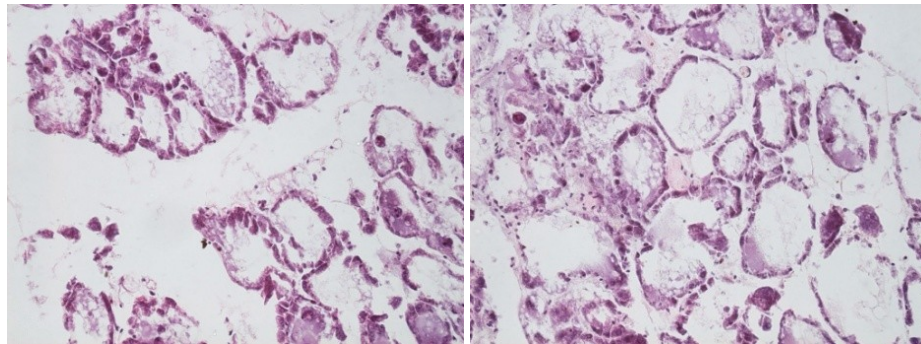


Role of miR-30b : over-expression

Lactation day-12

Non Tg

Tg

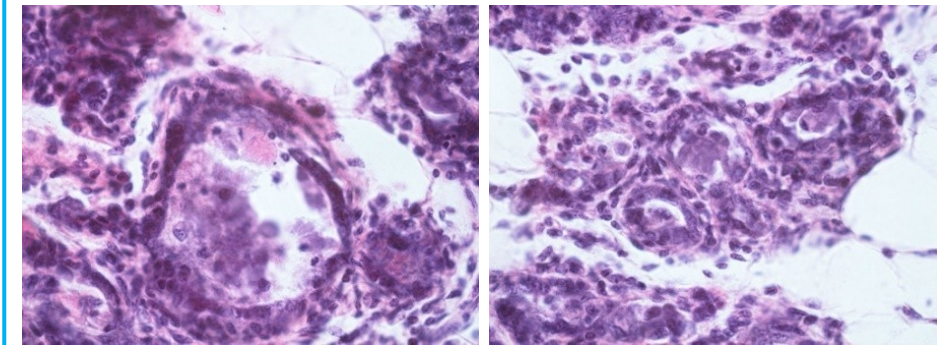
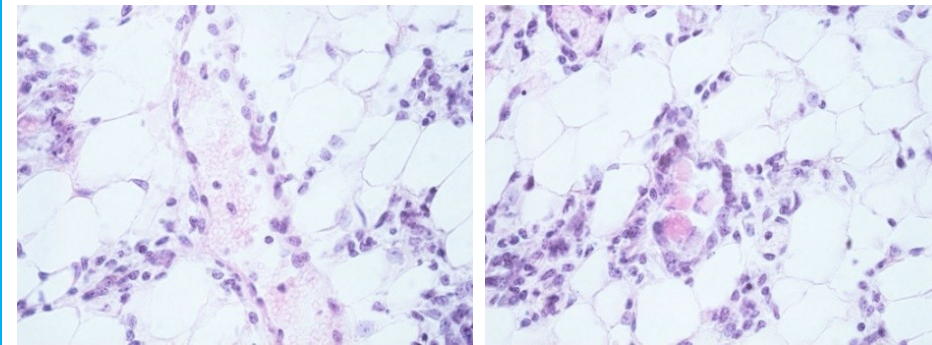
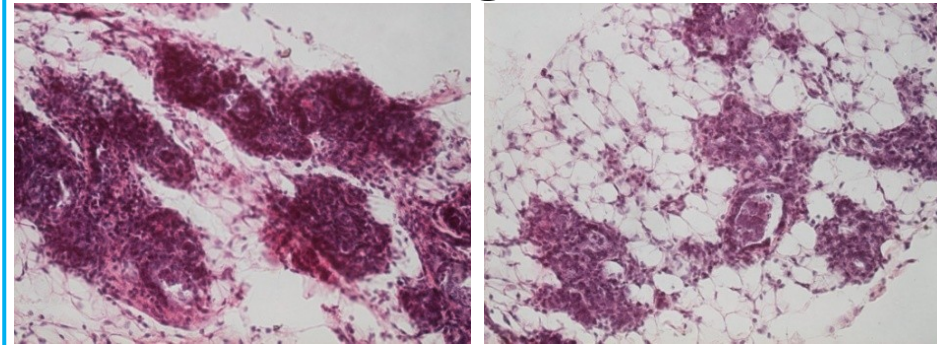
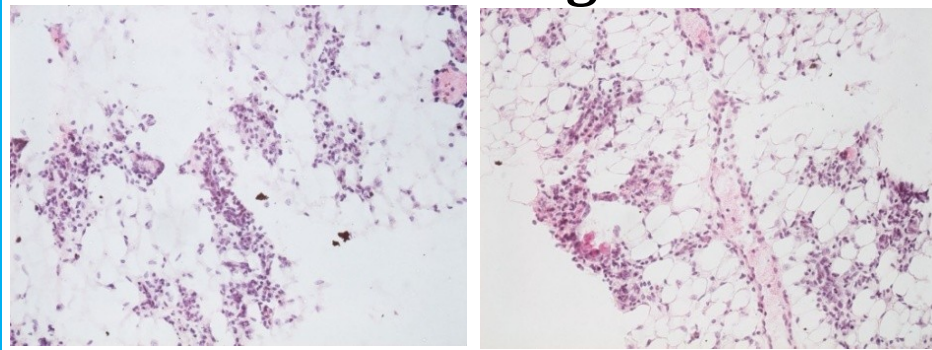


Role of miR-30b : over-expression

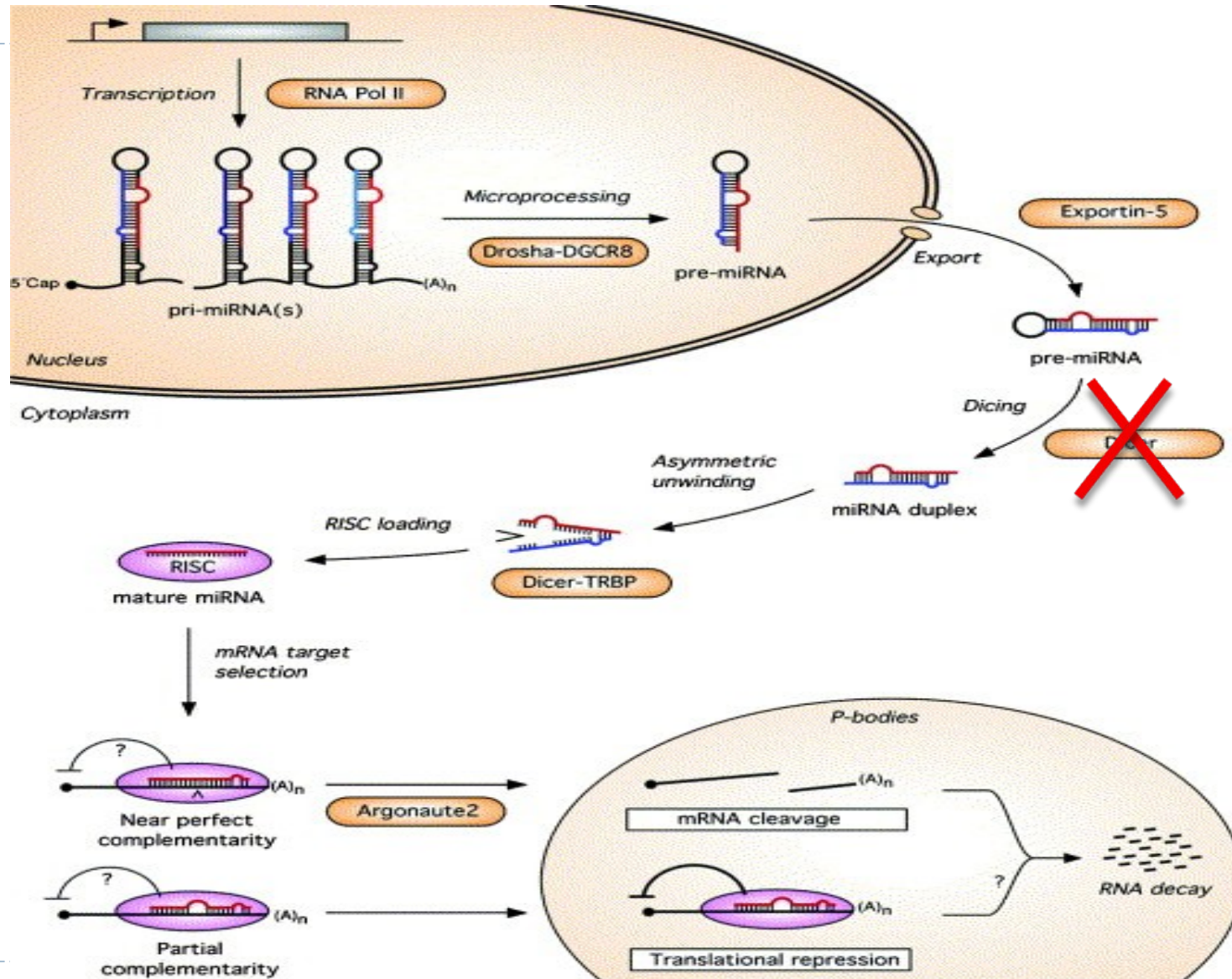
Involution day-6

Non Tg

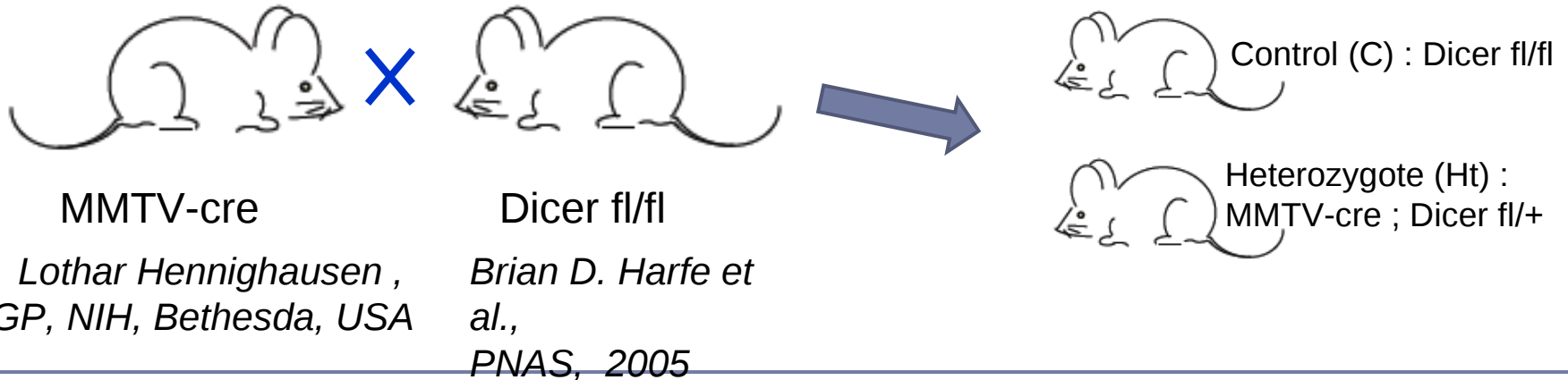
Tg



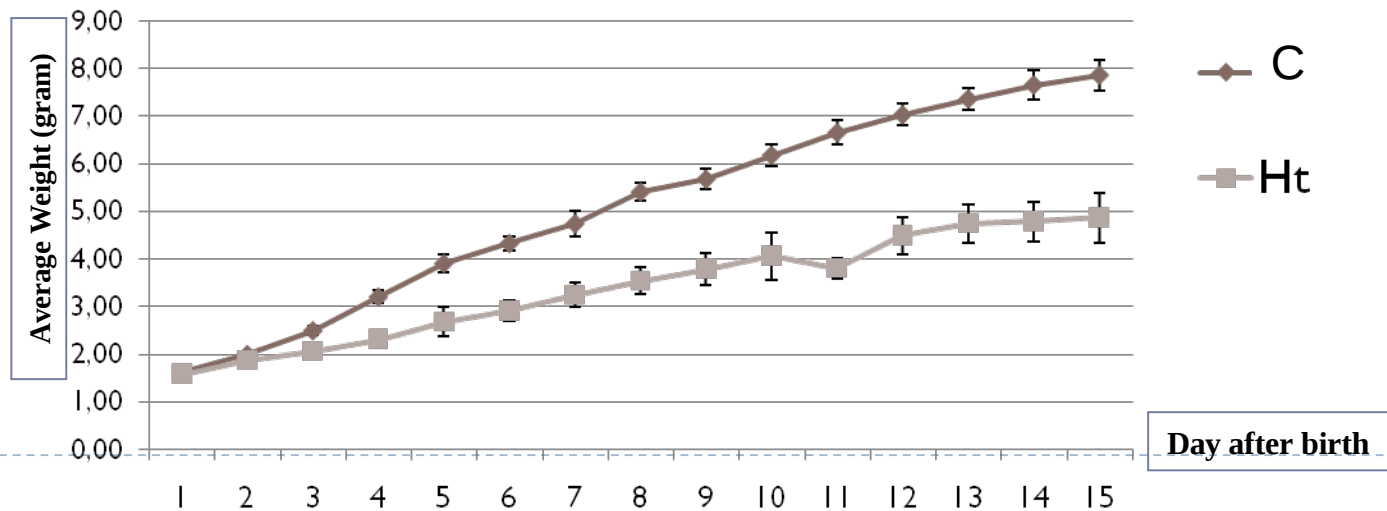
Down regulation of miRNAs biosynthesis



Down regulation of miRNAs biosynthesis



Growth curves of pups feeding by Heterozygote (Ht) or Control (C) dams.



Down regulation of miRNAs biosynthesis

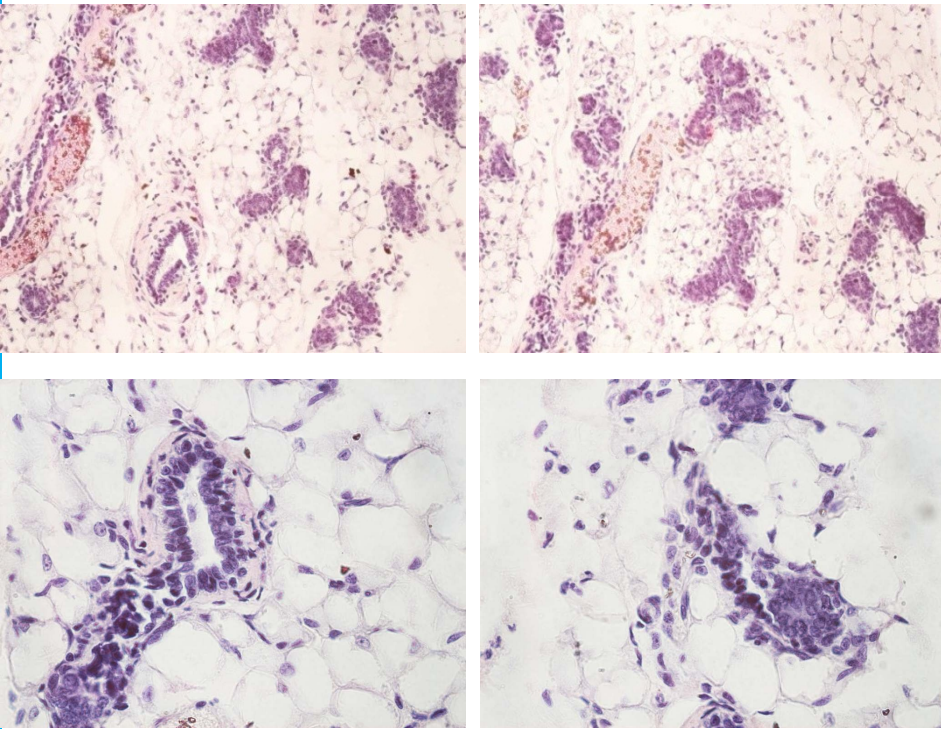
- ▶ Stages collected:
 - ▶ Virgin 6w
 - ▶ Pregnancy 6d, 12d, 16d
 - ▶ Lactation 3d, 7d
 - ▶ Involution 3d, 6d



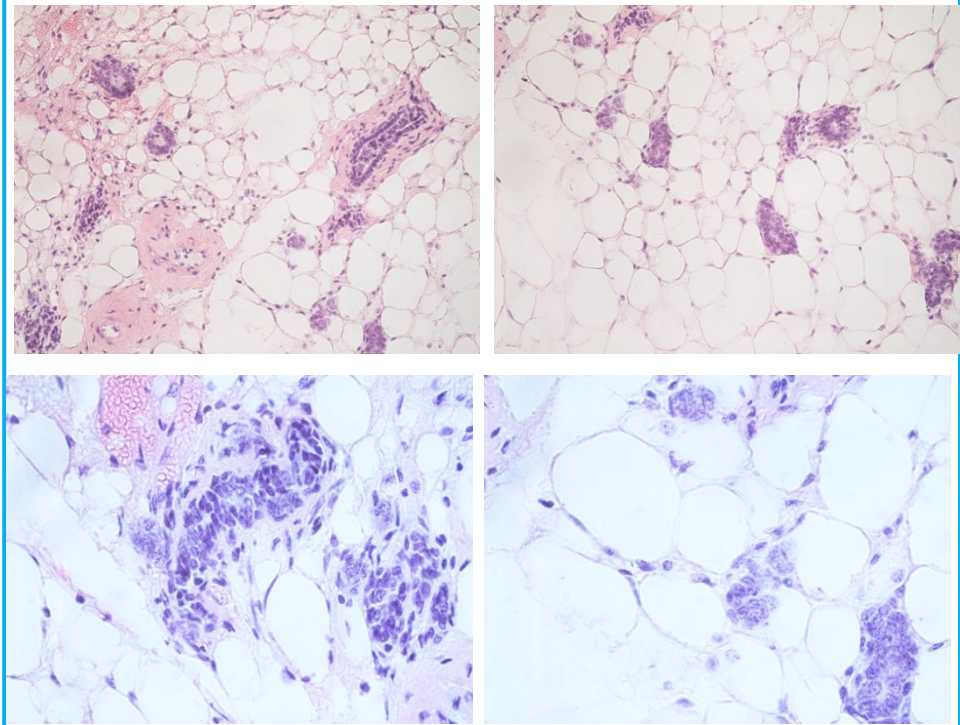
Down regulation of miRNAs biosynthesis

Gestation day-6

Control



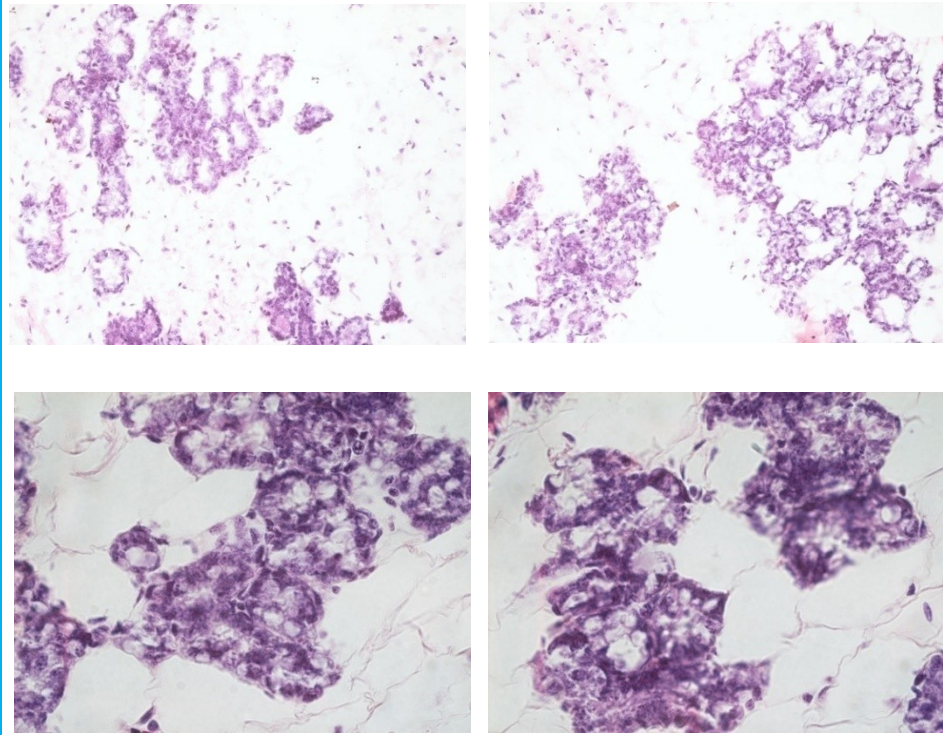
MD Heterozygote



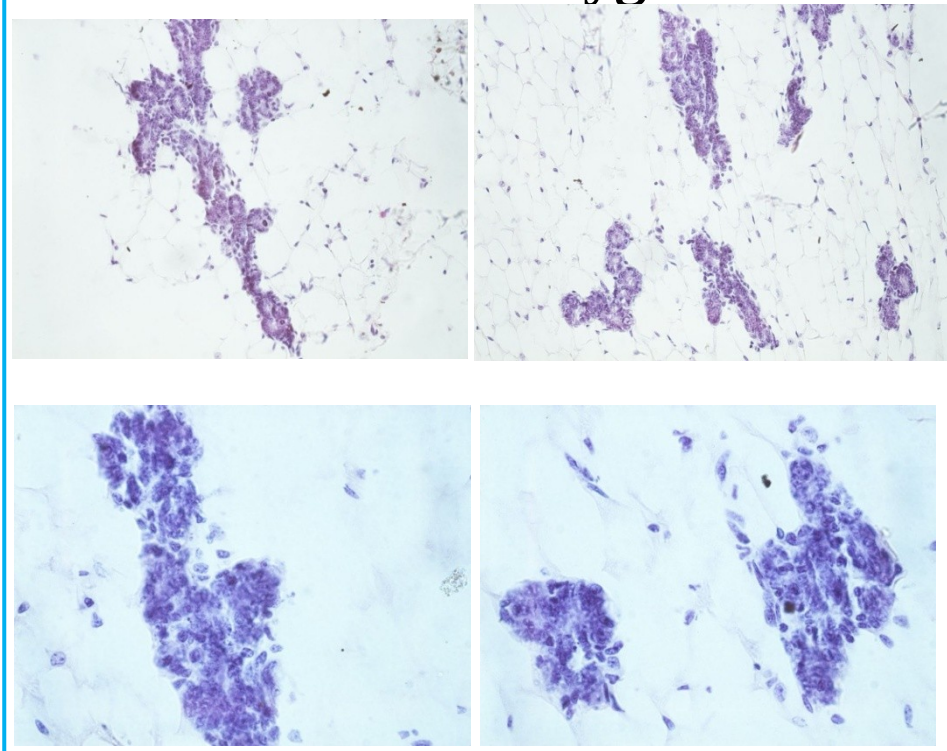
Down regulation of miRNAs biosynthesis

Gestation day-16

Control



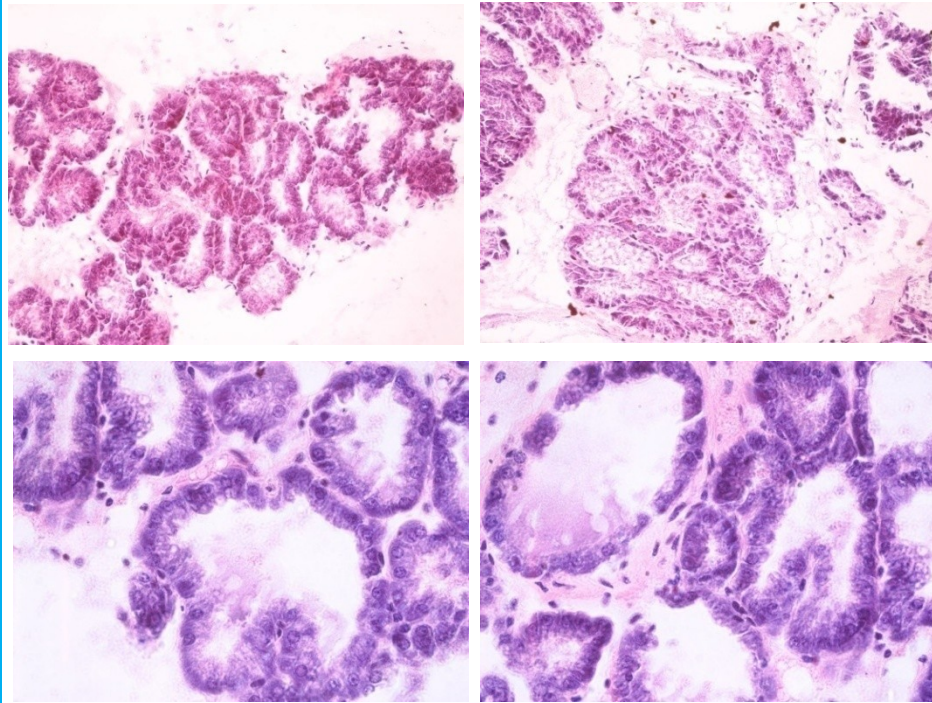
MD Heterozygote



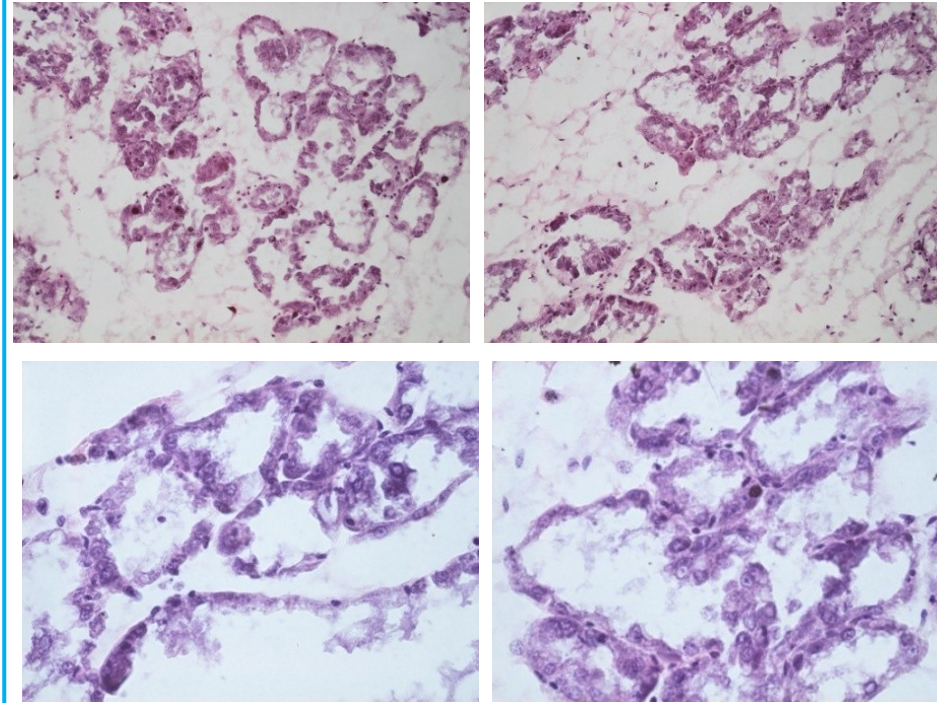
Down regulation of miRNAs biosynthesis

Lactation day-7

Control



MD Heterozygote



Conclusions

miRNAS are important to normal mammary gland development and differentiation

- ▶ **Currently**
 - ▶ Phenotype characterization :
 - ▶ Tissue structure by electronic microscopy
 - ▶ Specific cell markers by immunostaining
 - ▶ Epithelial cell populations analyses by FACS
 - ▶ Transcriptomic studies to characterize the signaling pathways involved
 - ▶ miR-30b targets



Team : Differentiation and Specialisation of Cells (DISC)
Lab : Génétique Animale et Biologie Intégrative (GABI),
INRA, Jouy-en-Josas, France



Poster # 81

MicroRNAs involvement in the development of the mouse mammary gland

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miR library

