RumimiR:
a detailed microRNA database focused on ruminant species

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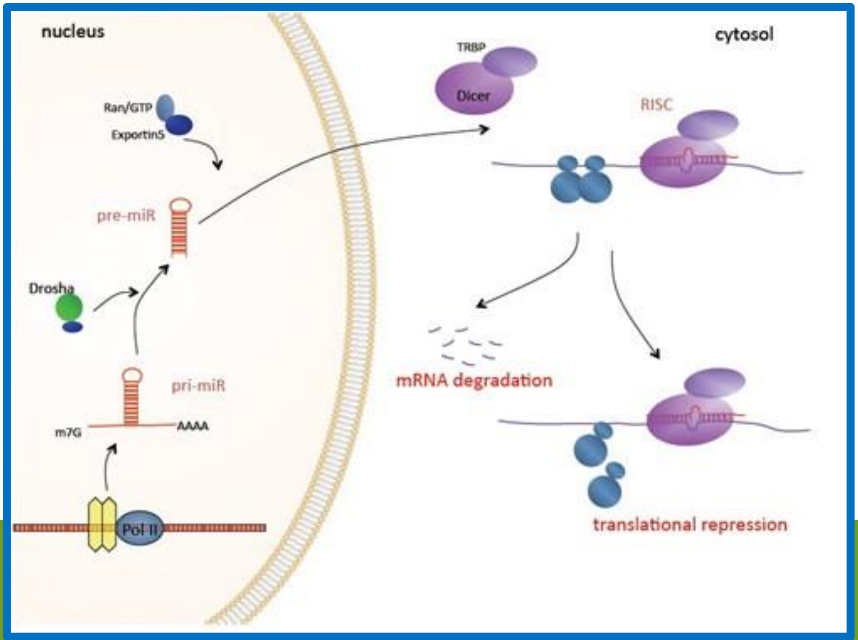
microRNAs

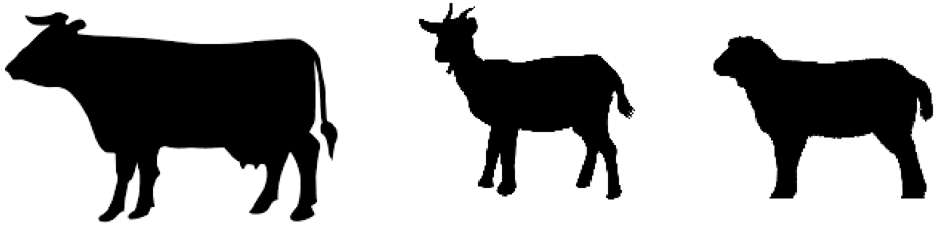
Small non-coding endogenous RNAs 17-22 nt in length

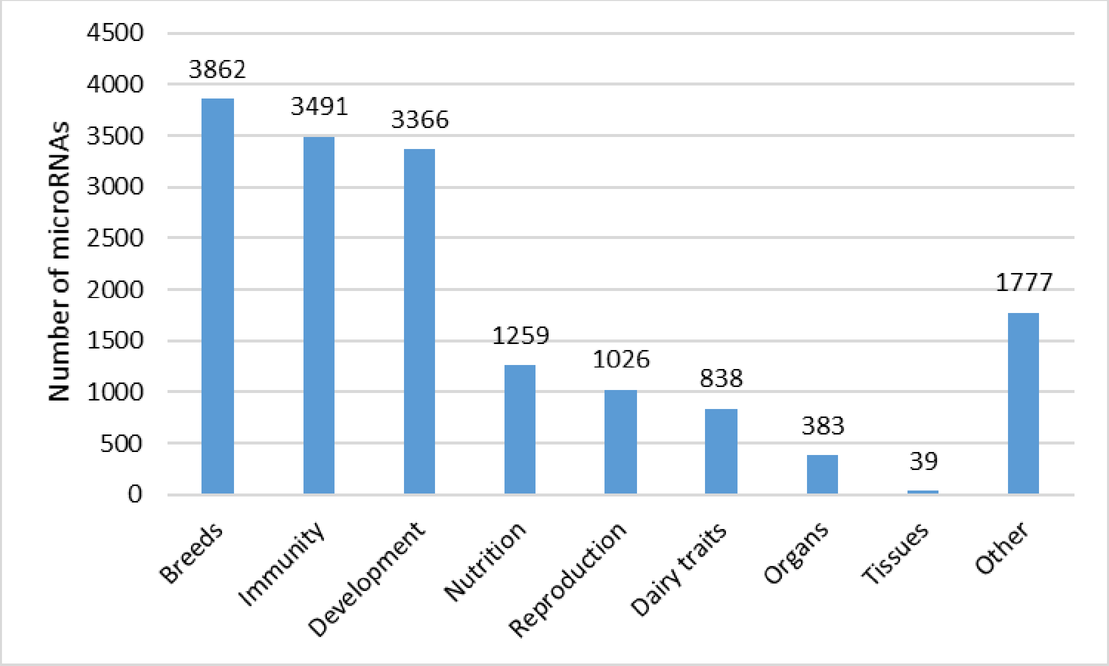
Post-transcriptional regulators of genes

Highly conserved among species



78 papers describing ruminant microRNAs





Bovine and caprine mammary gland miRNomes
(Le Guillou et al., 2014; Mobuchon et al., 2015a)

Nutritional regulation of microRNA expression in lactation cattle and goat mammary gland
(Mobuchon et al., 2015b; Mobuchon et al., 2017)

miRNome differences in mammary tissue of lactating Holstein and Montbéliarde cows (Billa et al., 2019)

miRNome differences in Holstein and Normande whole milk
(Le Guillou et al., 2019, EAAP)

The searchable database of published microRNA sequences and annotations

Created in 2006 by Griffiths-Jones
University of Manchester, UK

Listing microRNAs for 271 species
38 589 entries

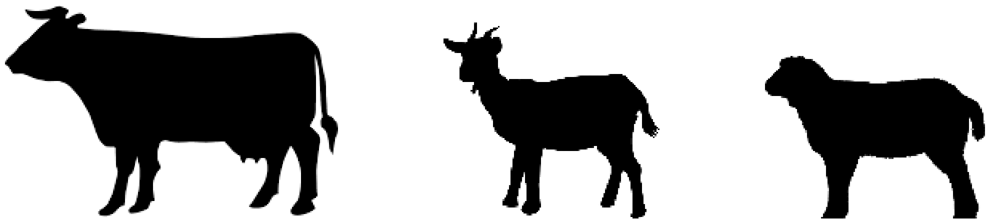
miRBase

Last release miRBase 22 (october 2018)

Does not contain all published microRNAs:
Only 5% of small RNA deep sequencing data are collected (Kazomara et al, 2019)

Bovine: 1 025
Caprine: 436
Ovine: 153

A detailed microRNA database focused on ruminant species



An exhaustive microRNA database containing all published microRNAs

An adapted microRNA database for ruminant research

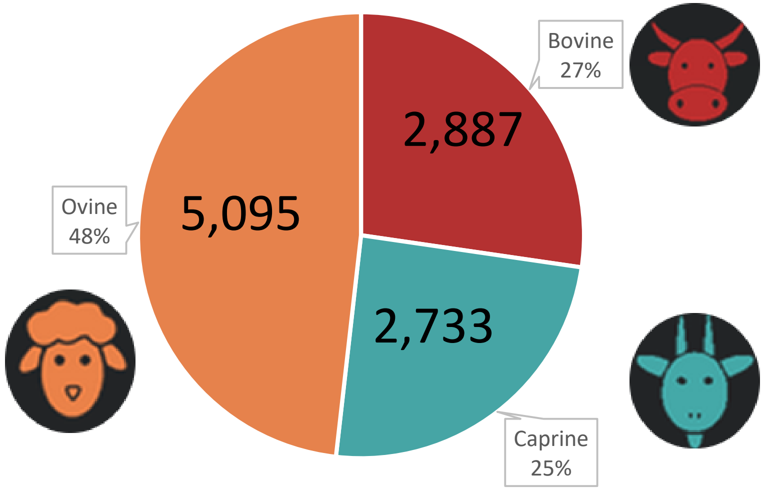
Freely available online:

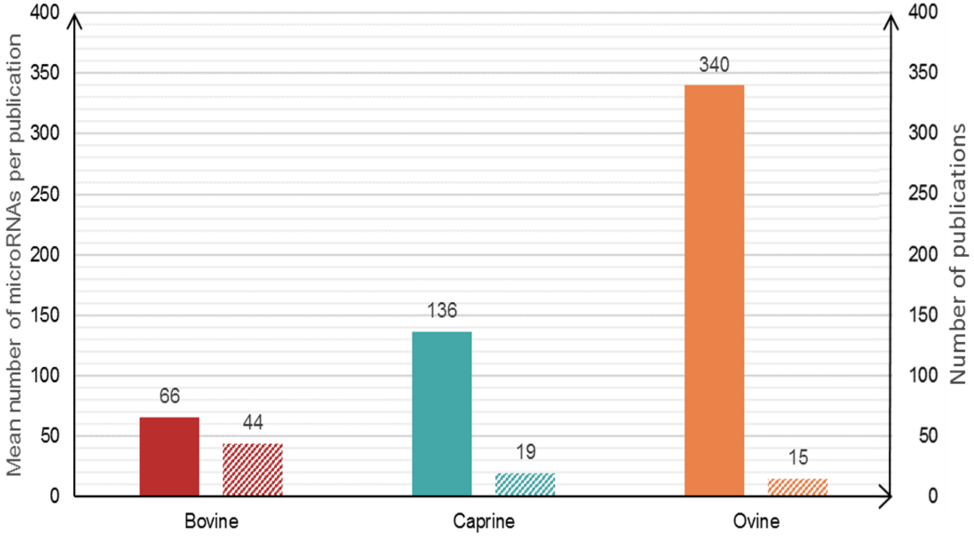
http://rumimir.sigenae.org/

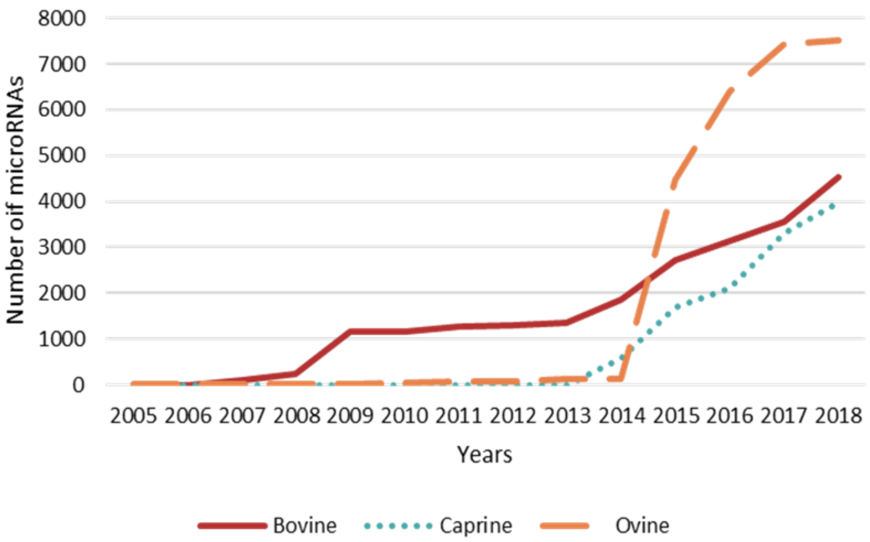
rumimir@inra.fr

Data collected from 78 publications

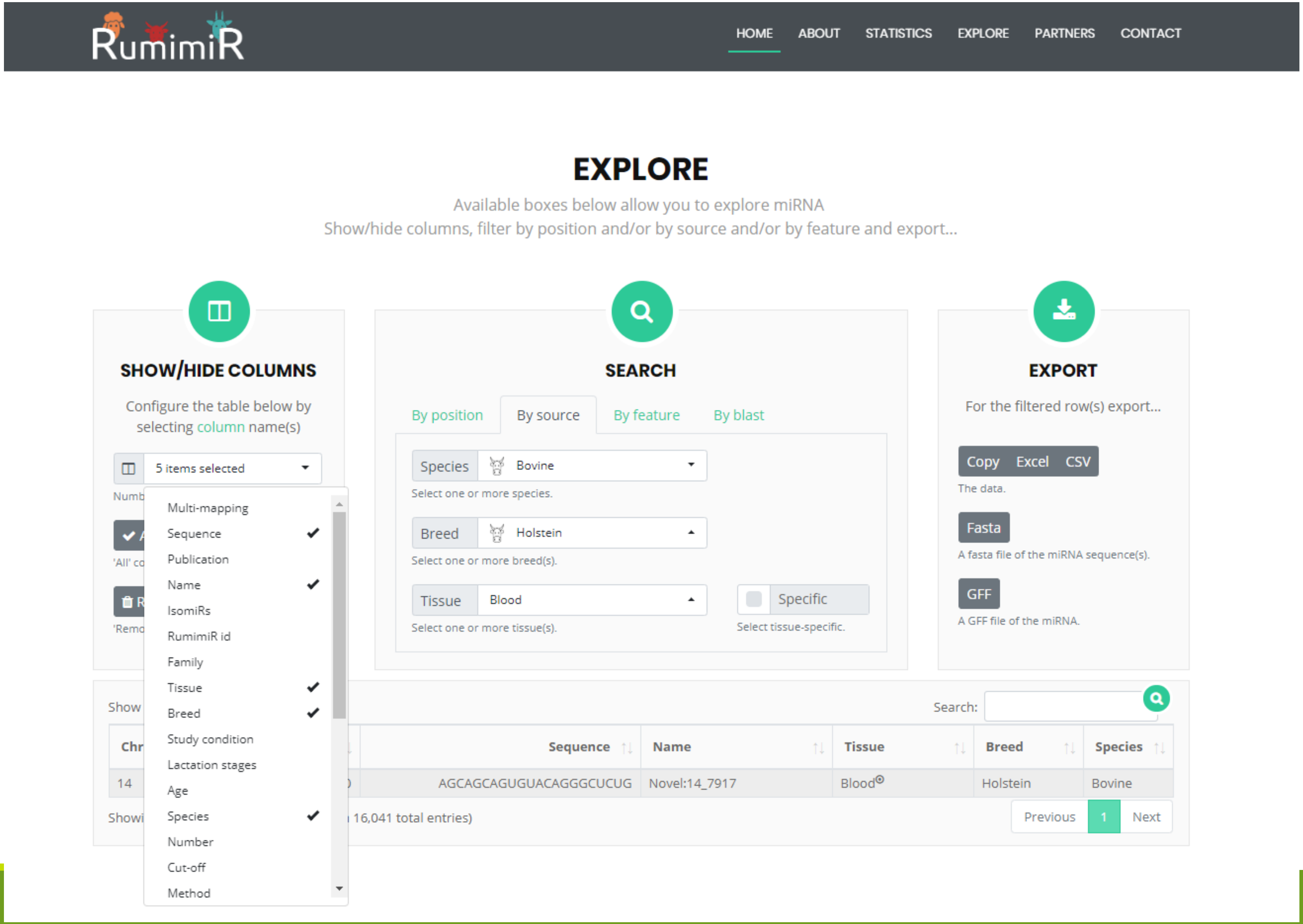
10,715 microRNAs
(miRBase V22: 1,634)







User interface



EXPLORE

Available boxes below allow you to explore miRNA
Show/hide columns, filter by position and/or by source and/or by feature and export...

SHOW/HIDE COLUMNS

Configure the table below by selecting column name(s)

5 items selected

SEARCH

Species: Bovine
Select one or more species.

Breed: Holstein
Select one or more breed(s).

Tissue: Blood
Select one or more tissue(s).

☐ Specific
Select tissue-specific.

EXPORT

For the filtered row(s) export...

The data.

A fasta file of the miRNA sequence(s).

A GFF file of the miRNA.

Search:

Chr	Sequence	Name	Tissue	Breed	Species
14	AGCAGCAGUGUACAGGGCUCUG	Novel:14_7917	Blood	Holstein	Bovine

16,041 total entries)

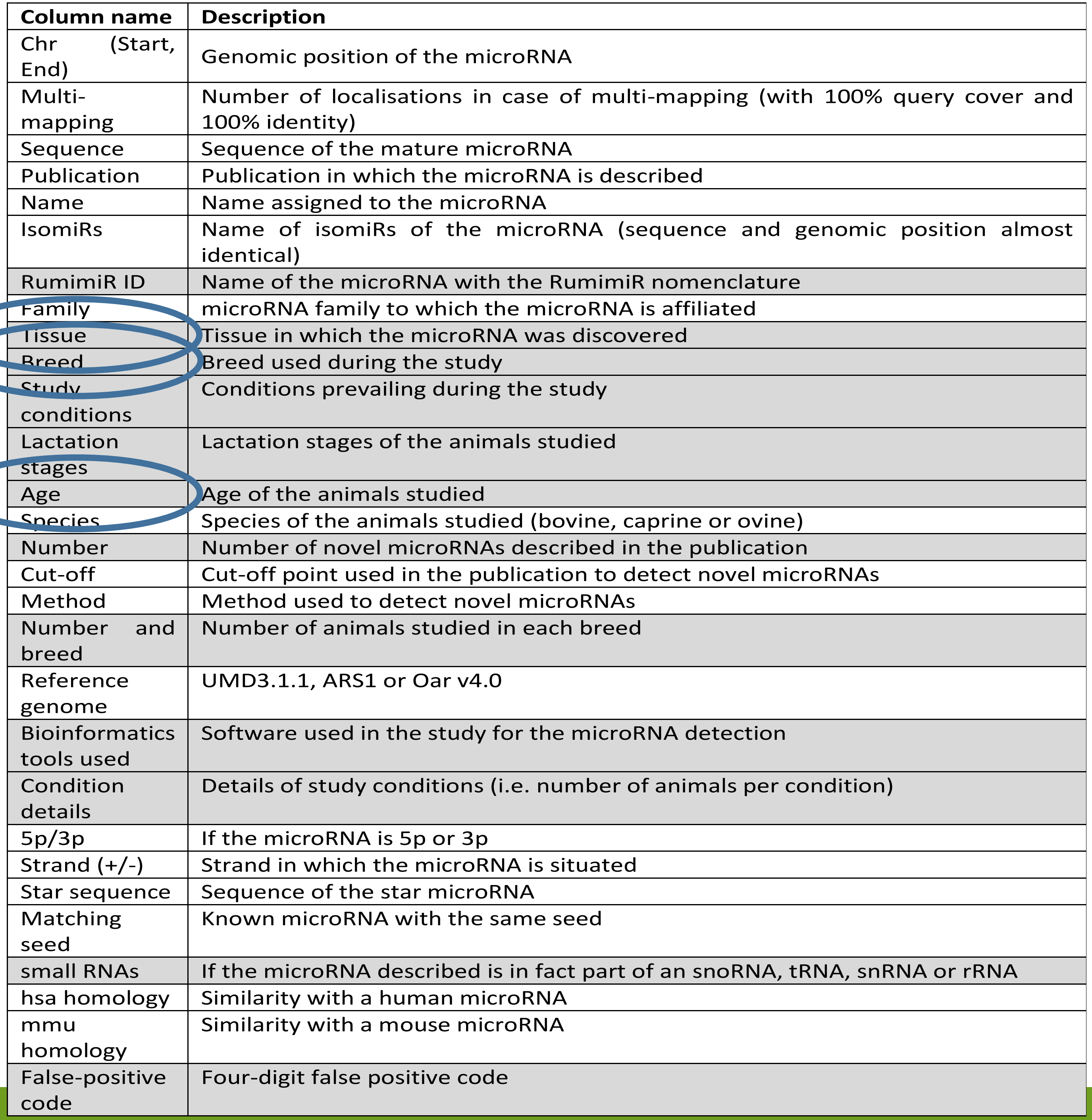
Alignement to unique reference genome:
Bovine: UMD3.1.1
Caprine: ARS1
Ovine: Oar v4.0

For each microRNA: 29 items are collected when available in the publication

Column name	Description
Chr (Start, End)	Genomic position of the microRNA
Multi-mapping	Number of localisations in case of multi-mapping (with 100% query cover and 100% identity)
Sequence	Sequence of the mature microRNA
Publication	Publication in which the microRNA is described
Name	Name assigned to the microRNA
IsomiRs	Name of isomiRs of the microRNA (sequence and genomic position almost identical)
RumimiR ID	Name of the microRNA with the RumimiR nomenclature
Family	microRNA family to which the microRNA is affiliated
Tissue	Tissue in which the microRNA was discovered
Breed	Breed used during the study
Study conditions	Conditions prevailing during the study
Lactation stages	Lactation stages of the animals studied
Age	Age of the animals studied
Species	Species of the animals studied (bovine, caprine or ovine)
Number	Number of novel microRNAs described in the publication
Cut-off	Cut-off point used in the publication to detect novel microRNAs
Method	Method used to detect novel microRNAs
Number and breed	Number of animals studied in each breed
Reference genome	UMD3.1.1, ARS1 or Oar v4.0
Bioinformatics tools used	Software used in the study for the microRNA detection
Condition details	Details of study conditions (i.e. number of animals per condition)
5p/3p	If the microRNA is 5p or 3p
Strand (+/-)	Strand in which the microRNA is situated
Star sequence	Sequence of the star microRNA
Matching seed	Known microRNA with the same seed
small RNAs	If the microRNA described is in fact part of an snoRNA, tRNA, snRNA or rRNA
hsa homology	Similarity with a human microRNA
mmu homology	Similarity with a mouse microRNA
False-positive code	Four-digit false positive code

For each microRNA: 29 items are collected when available in the publication

12 items not available in miRBase



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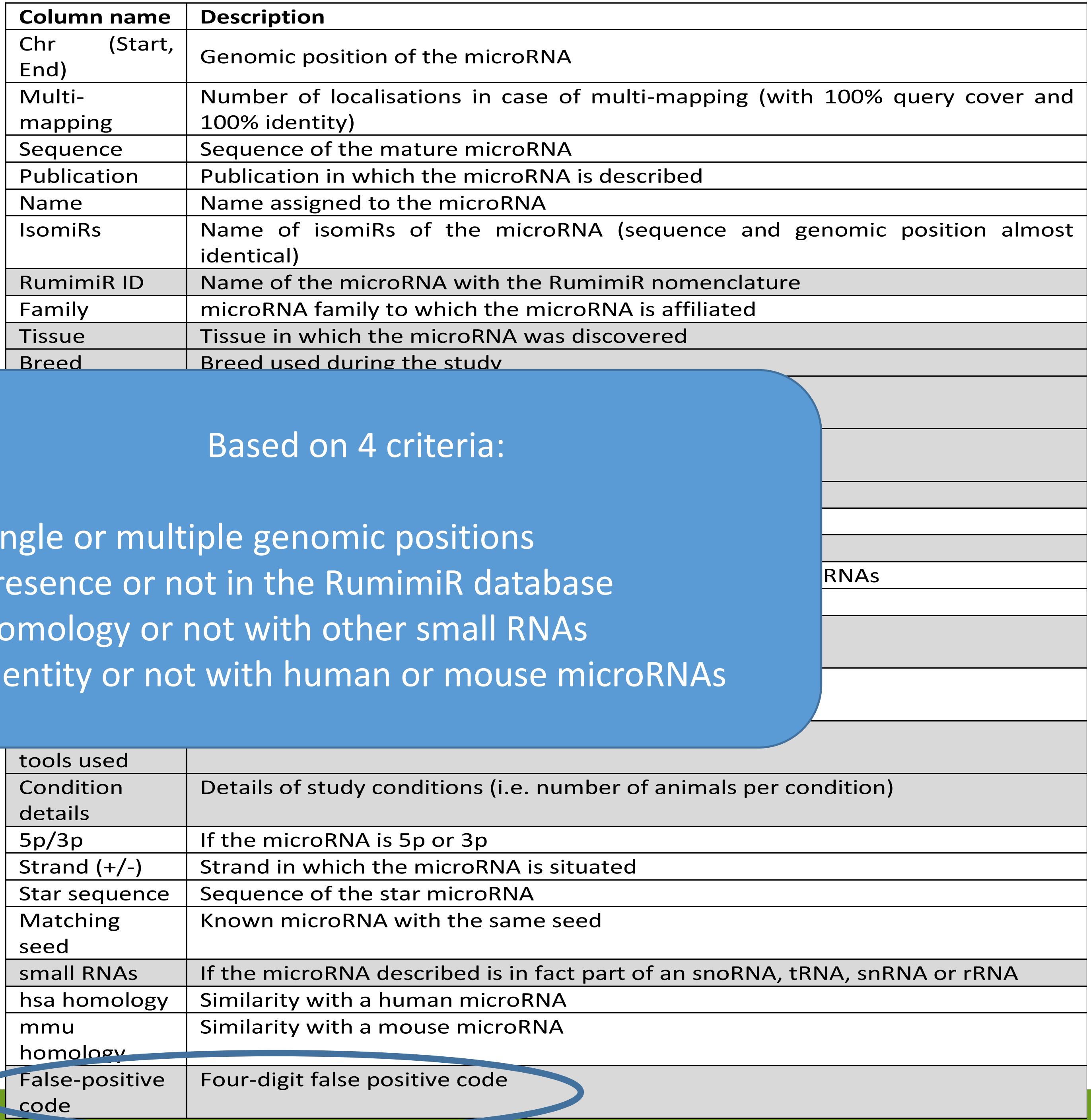
A false-positive code is proposed



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	RNAs
tools used	
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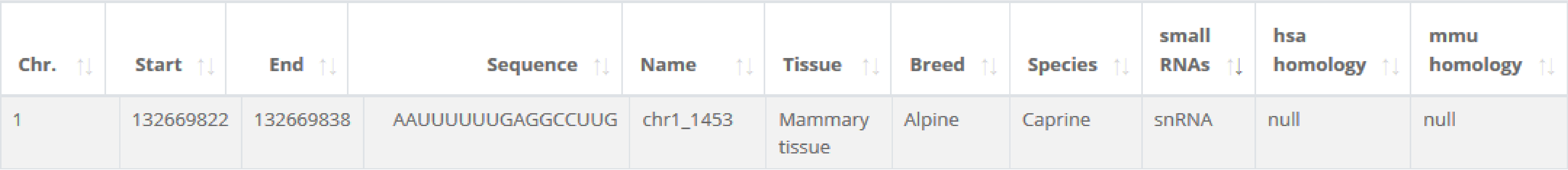
Based on 4 criteria:

- ✓ Single or multiple genomic positions
- ✓ Presence or not in the RumimiR database
- ✓ Homology or not with other small RNAs
- ✓ Identity or not with human or mouse microRNAs



Chr.	Start	End	Sequence	Name	Tissue	Breed	Species	small RNAs	hsa homology	mmu homology
1	132669822	132669838	AAUUUUUUGAGGCCUUG	chr1_1453	Mammary tissue	Alpine	Caprine	snRNA	null	null

In the future

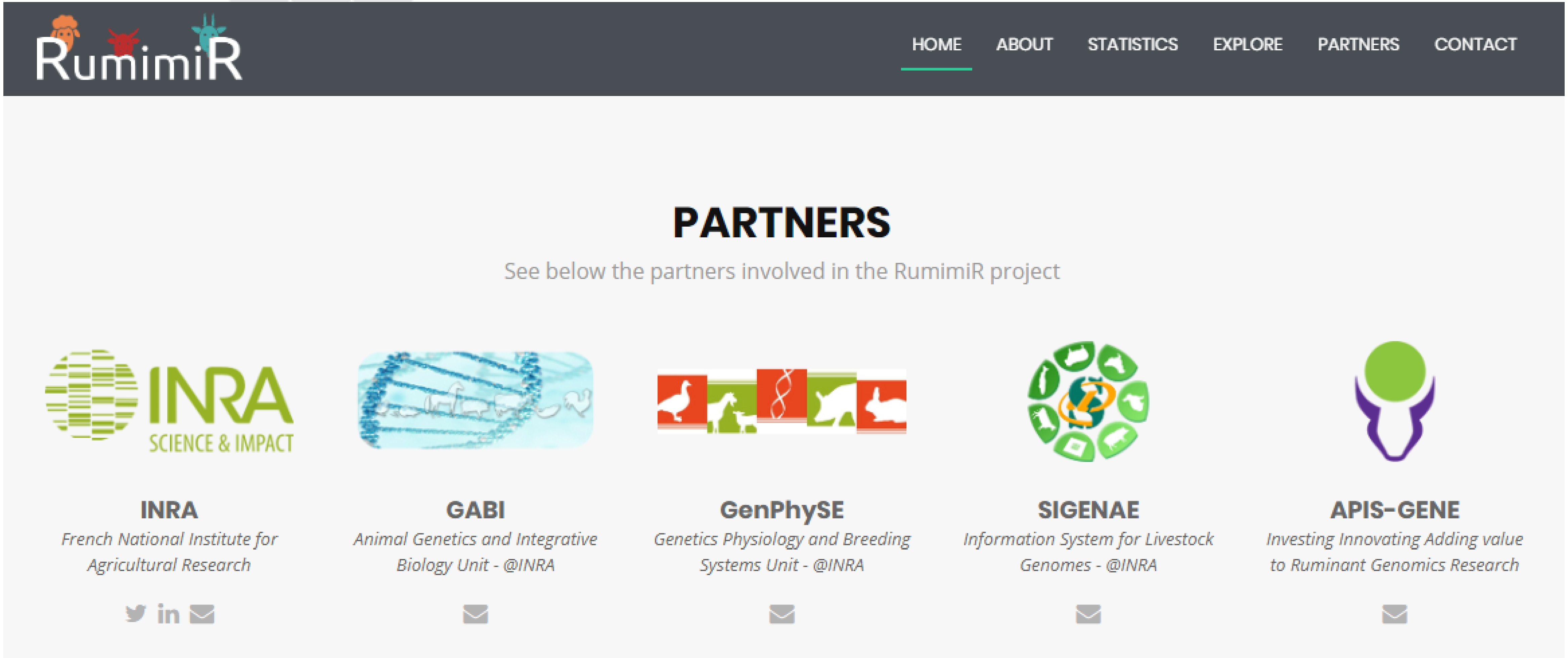
Integration of new data at least twice a year

Integration of genetic variants: miRSNPs

May be extended to other livestock species

"RumimiR: a detailed microRNA database focused on ruminant species“
Bourdon et al. 2019 **Database (Oxford) in press**

http://rumimir.sigenae.org/ rumimir@inra.fr



PARTNERS

See below the partners involved in the RumimiR project

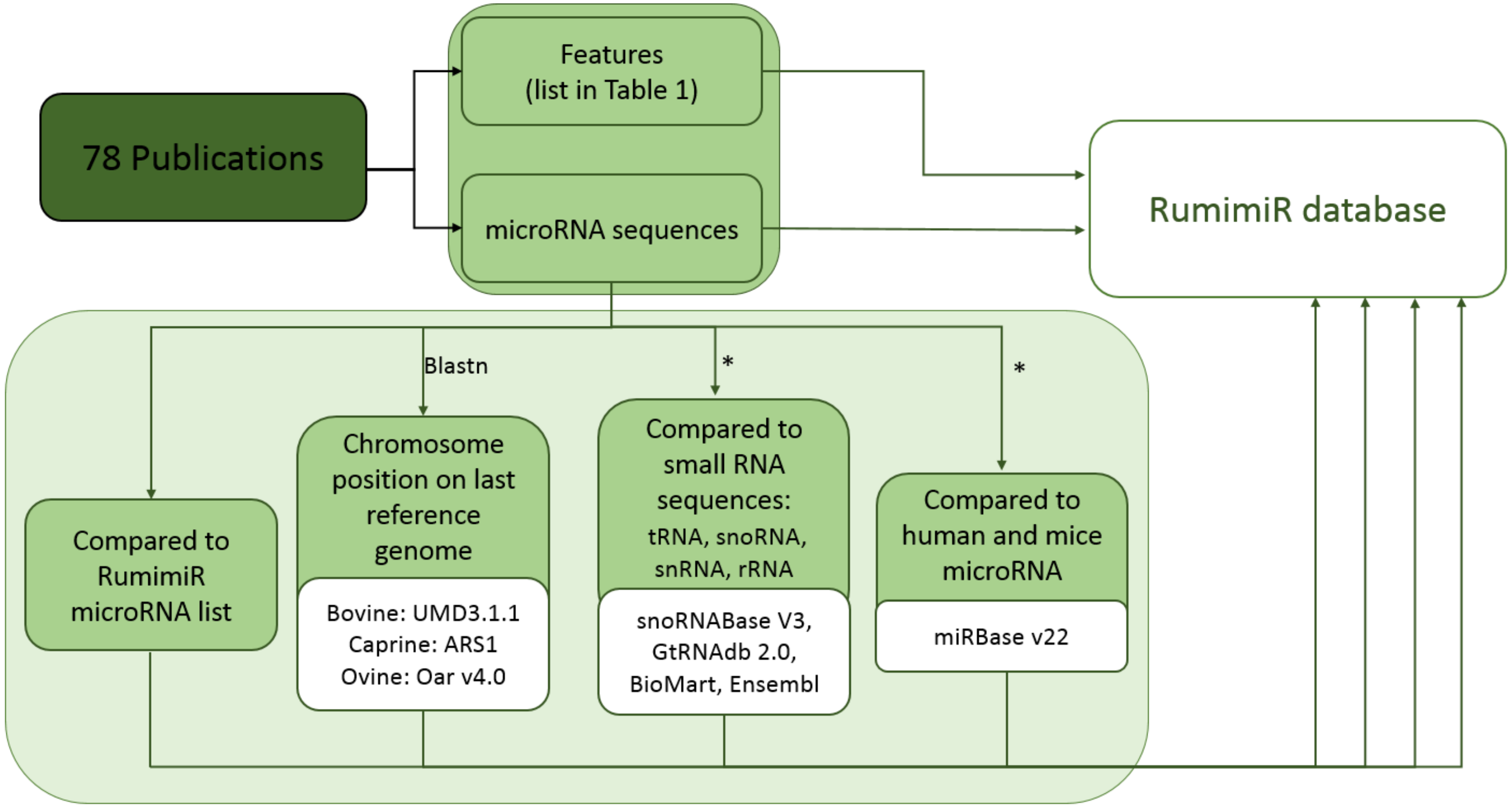
INRA
French National Institute for Agricultural Research

GABI
Animal Genetics and Integrative Biology Unit - @INRA

GenPhySE
Genetics Physiology and Breeding Systems Unit - @INRA

SIGENAE
Information System for Livestock Genomes - @INRA

APIS-GENE
Investing Innovating Adding value to Ruminant Genomics Research



78 Publications

Features
(list in Table 1)

microRNA sequences

RumimiR database

Blastn

*

*

Compared to
RumimiR
microRNA list

Chromosome
position on last
reference
genome

Bovine: UMD3.1.1
Caprine: ARS1
Ovine: Oar v4.0

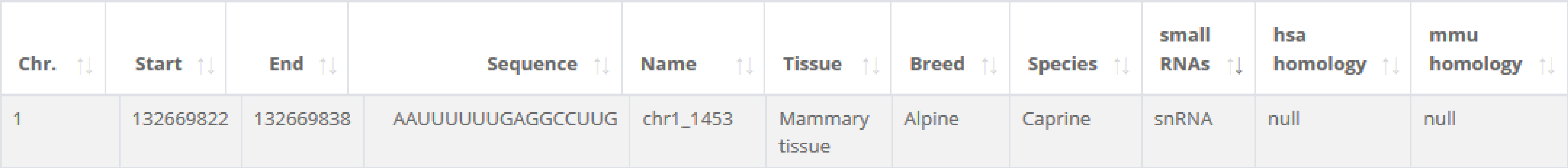
Compared to
small RNA
sequences:
tRNA, snoRNA,
snRNA, rRNA

snoRNABase V3,
GtRNAdb 2.0,
BioMart, Ensembl

Compared to
human and mice
microRNA

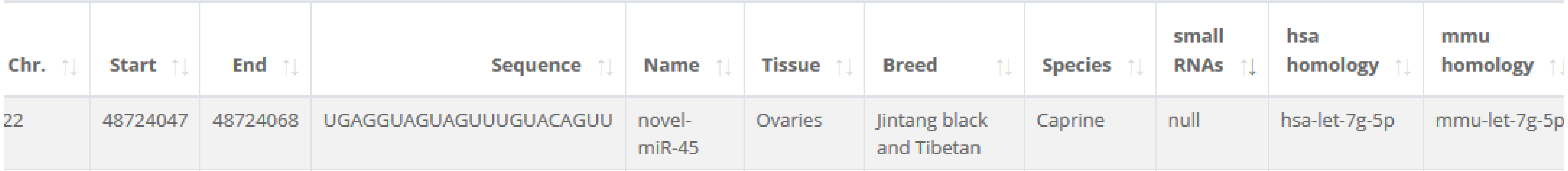
miRBase v22

Example: small RNAs



Chr.	Start	End	Sequence	Name	Tissue	Breed	Species	small RNAs	hsa homology	mmu homology
1	132669822	132669838	AAUUUUUUGAGGCCUUG	chr1_1453	Mammary tissue	Alpine	Caprine	snRNA	null	null

Example: identity *hsa- mmu-*



Chr.	Start	End	Sequence	Name	Tissue	Breed	Species	small RNAs	hsa homology	mmu homology
22	48724047	48724068	UGAGGUAGUAGUUUGUACAGUU	novel-miR-45	Ovaries	Jintang black and Tibetan	Caprine	null	hsa-let-7g-5p	mmu-let-7g-5p

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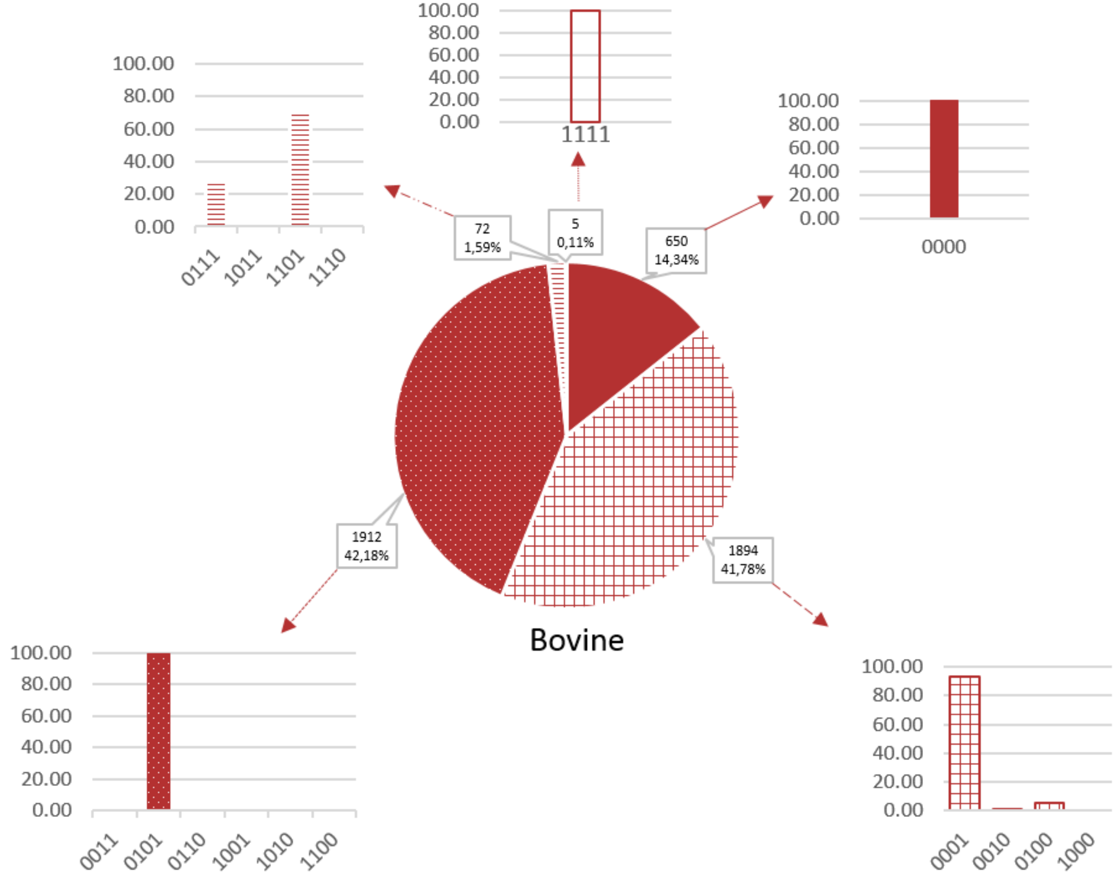
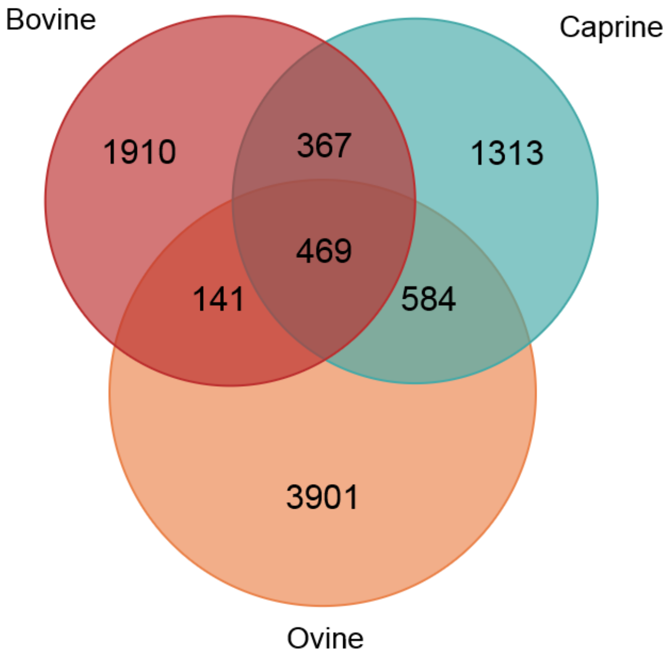
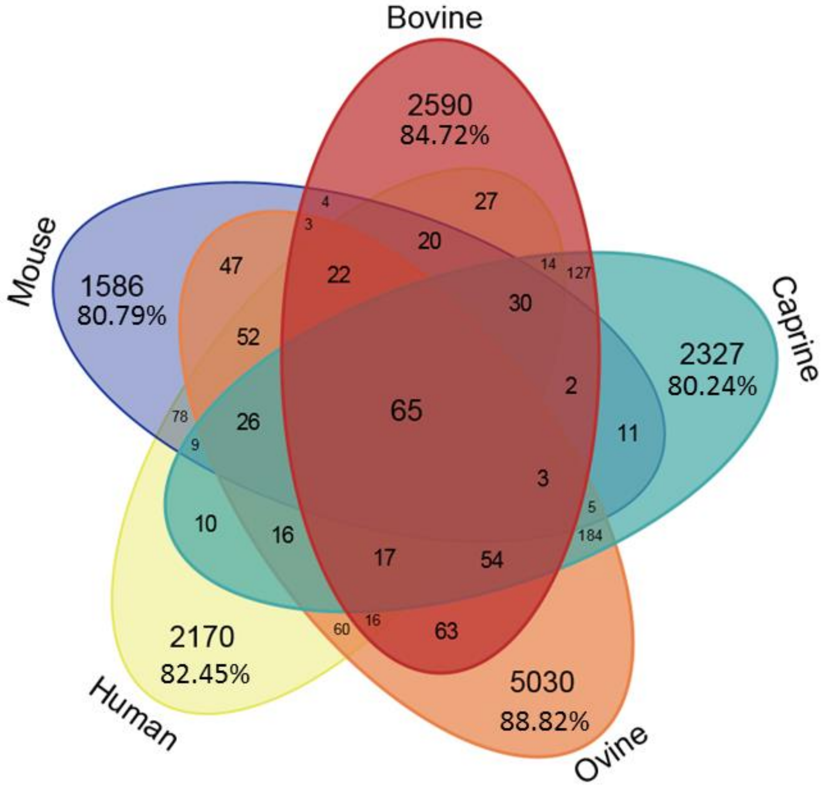



Bovine
Caprine
1910
367
1313
469
141
584
3901
Ovine


Bovine
2590
84.72%
Mouse
1586
80.79%
4
3
27
20
22
47
14
127
30
52
Caprine
2327
80.24%
2
65
11
78
26
9
3
5
184
10
16
17
54
60
16
63
2170
82.45%
Human
5030
88.82%
Ovine