

miR-210-3p MTIs (Shona)

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Investigating the predicted and validated targets of miR-210-3p

Check miRNA sequence across species

Sequence is conserved across hsa, mmu and rno

```
##      miRNA_ID      miR_seq
## 1 mmu-miR-210-3p CUGUGCGUGUGACAGCGGCUGA
## 2 hsa-miR-210-3p CUGUGCGUGUGACAGCGGCUGA
## 3 rno-miR-210-3p CUGUGCGUGUGACAGCGGCUGA
```

Identify predicted targets from miRDIP (hsa only)

Code adapted from: http://ophid.utoronto.ca/mirDIP/api_R.jsp Citation: Tokar T, et al., mirDIP 4.1-integrative database of human microRNA target predictions. Nucleic Acids Res. 2018 Jan 4;46(D1):D360-D370. doi: 10.1093/nar/gkx1144. PubMed PMID: 29194489.

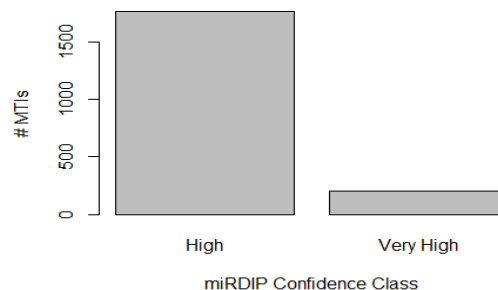
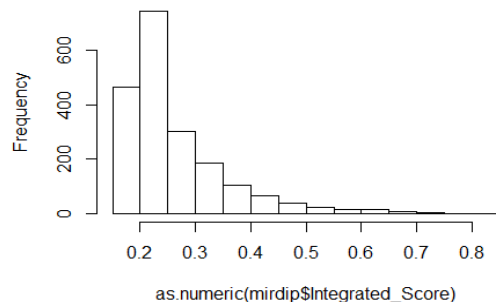
There are

```
## [1] 1966
```

predicted targets of hsa-miR-210-3p, with VeryHigh or High confidence class

We can visualise the distribution of miRDIP scores etc.

Histogram of as.numeric(mirdip\$Integrated_Score)

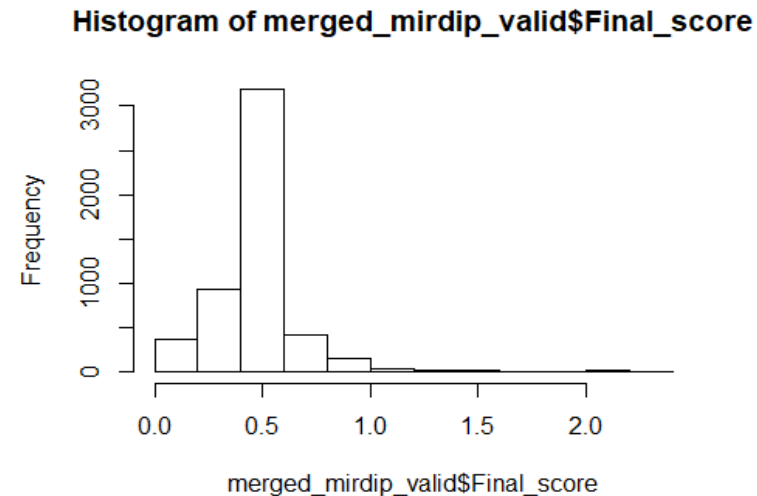


Identify MTIs with experimental evidence (including hsa, mmu, rno)

There are

```
## [1] 5129
```

miRNA-target interactions that are predicted and/or validated



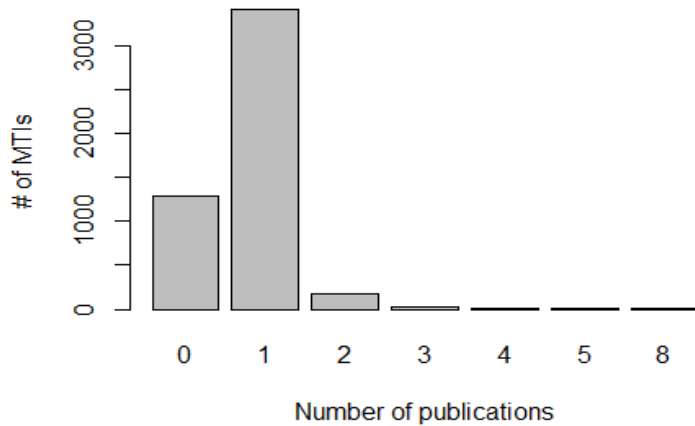
The number of MTIs per species shows that we have many more MTIs for hsa than mmu and rno

```
## MTI_per_species
## hsa mmu rno
## 4667 457 5
```

Combine all MTIs, and analyse summarised info

Number of publications per MTI:

```
##
## 0 1 2 3 4 5 8
## 1287 3417 177 20 4 2 1
```



Types of MTI Evidence (for each species- hsa, mmu, rno):
 [Strong - low-throughput experiment such as WB, PCR or Luciferase reporter assay] [Weak - high-throughput experiment such as microarray or high-throughput sequencing]

```
##
##      0 PRED_ONLY    STRONG    WEAK
##      245      1367      78      3218

##
##      0 STRONG    WEAK
##      4453      15      440

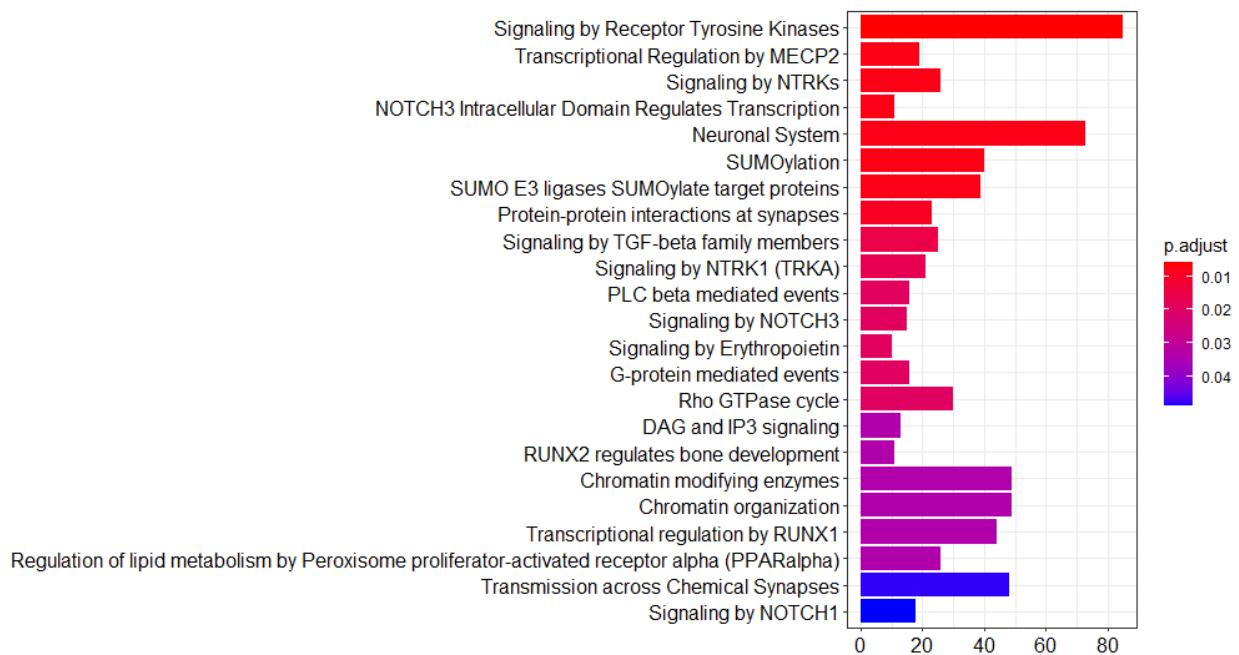
##
##      0 STRONG
##      4903      5
```

There are

```
## [1] 2009
```

MTIs that are either predicted (Very High or High) OR have strong experimental evidence

We will perform pathway enrichment on these (can output different types of plots if we choose)



Finally, We can look at individual mRNAs that might be of interest

```
##          miRNA target_gene          miR_target hsa_Iscore
## 3060    miR-210-3p        PTEN    miR-210-3p PTEN  0.2016375
## 2773    miR-210-3p        PDPK1    miR-210-3p PDPK1  0.2473995
## 2839    miR-210-3p        PIK3R1    miR-210-3p PIK3R1  0.1930922
## 2840    miR-210-3p        PIK3R5    miR-210-3p PIK3R5  0.3776871
## 2838    miR-210-3p        PIK3CG    miR-210-3p PIK3CG  0.1851818
## 3304    miR-210-3p        RPS6KA3    miR-210-3p RPS6KA3  0.1999240
## 3305    miR-210-3p        RPS6KB1    miR-210-3p RPS6KB1  0.0000000
## 33051    miR-210-3p        RPS6KB1    miR-210-3p RPS6KB1  0.0000000
## 2992    miR-210-3p        PRKAA1    miR-210-3p PRKAA1  0.2719685
##          hsa_miRDIP_conf_class hsa_References hsa_Experiments hsa_pub_cnt
## 3060                High                0      Microarrays          1
## 2773                High                0      HITS-CLIP          1
## 2839                High                0                0          0
## 2840                High                0                0          0
## 2838                High                0                0          0
## 3304                High                0      Microarrays          1
## 3305                0                0      Microarrays          1
## 33051                0                0      Microarrays          1
## 2992                High                0                0          0
##          hsa_Vscore          hsa_Fscore hsa_EvType mmu_References
mmu_Experiments
## 3060          0.5 0.701637504099249      WEAK          0
0
## 2773          0.5 0.74739952175452      WEAK          0
0
```

```

## 2839      0.0 0.193092227928857  PRED_ONLY      0
0
## 2840      0.0 0.377687126525435  PRED_ONLY      0
0
## 2838      0.0 0.185181772232437  PRED_ONLY      0
0
## 3304      0.5 0.699924011743739      WEAK      0
0
## 3305      0.5      0.5      WEAK      0
0
## 33051     0.5      0.5      WEAK      0
0
## 2992      0.0 0.271968514748404  PRED_ONLY      0
0
##      mmu_pub_cnt mmu_Vscore mmu_Fscore mmu_EvType rno_References
## 3060      0      0      0      0      0
## 2773      0      0      0      0      0
## 2839      0      0      0      0      0
## 2840      0      0      0      0      0
## 2838      0      0      0      0      0
## 3304      0      0      0      0      0
## 3305      0      0      0      0      0
## 33051     0      0      0      0      0
## 2992      0      0      0      0      0
##      rno_Experiments rno_pub_cnt rno_Vscore rno_Fscore rno_EvType
## 3060      0      0      0      0      0
## 2773      0      0      0      0      0
## 2839      0      0      0      0      0
## 2840      0      0      0      0      0
## 2838      0      0      0      0      0
## 3304      0      0      0      0      0
## 3305      0      0      0      0      0
## 33051     0      0      0      0      0
## 2992      0      0      0      0      0
##      total_pub_cnt
## 3060      1
## 2773      1
## 2839      0
## 2840      0
## 2838      0
## 3304      1
## 3305      1
## 33051     1
## 2992      0

```