

Fight against Ebola

— *in silico* —

or

What can we achieve with a good dram of whisky?

(+ some Misc/Whisk-ellaneous)



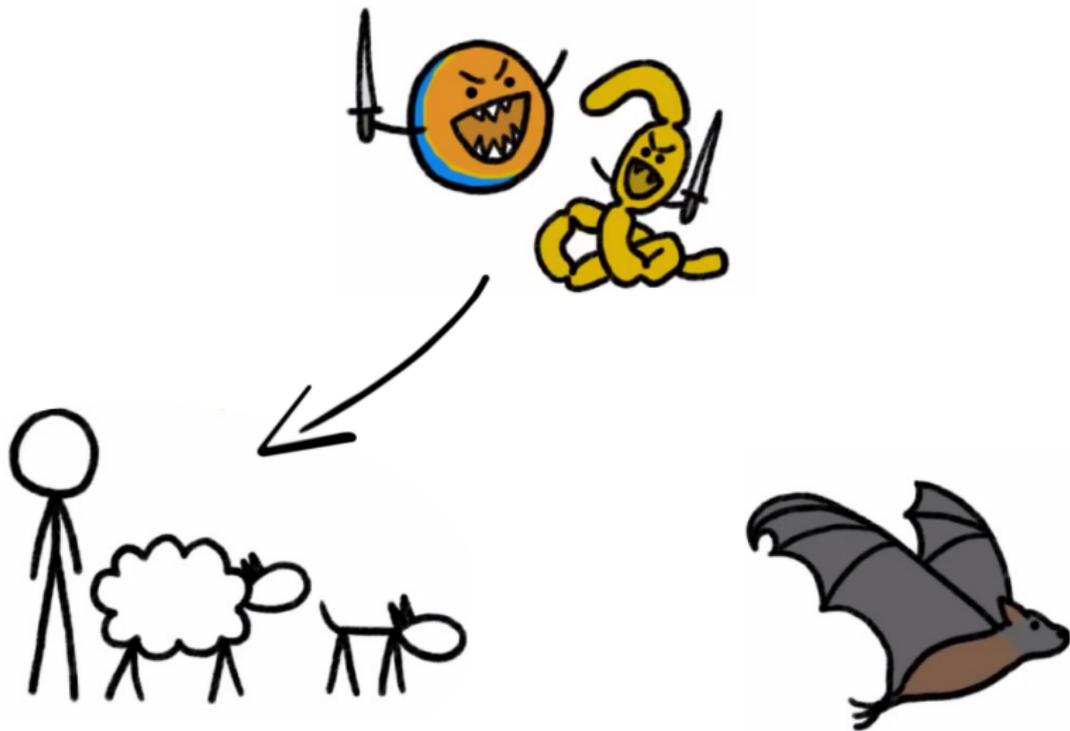
seit 1558

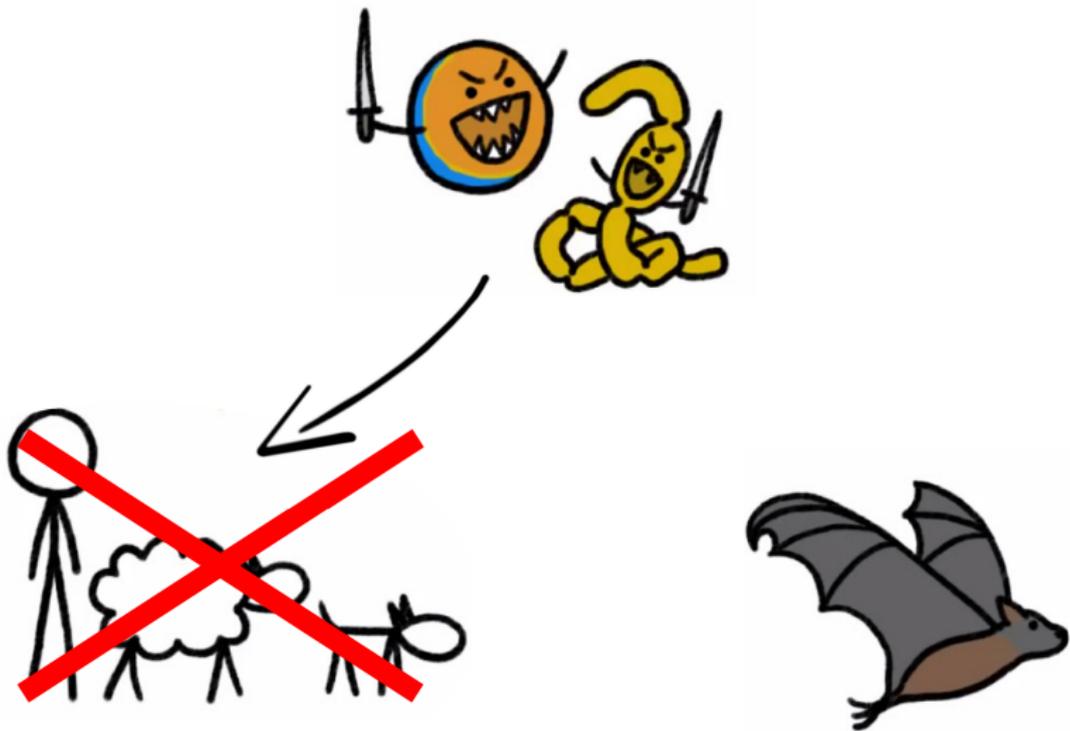
Martin Hölzer

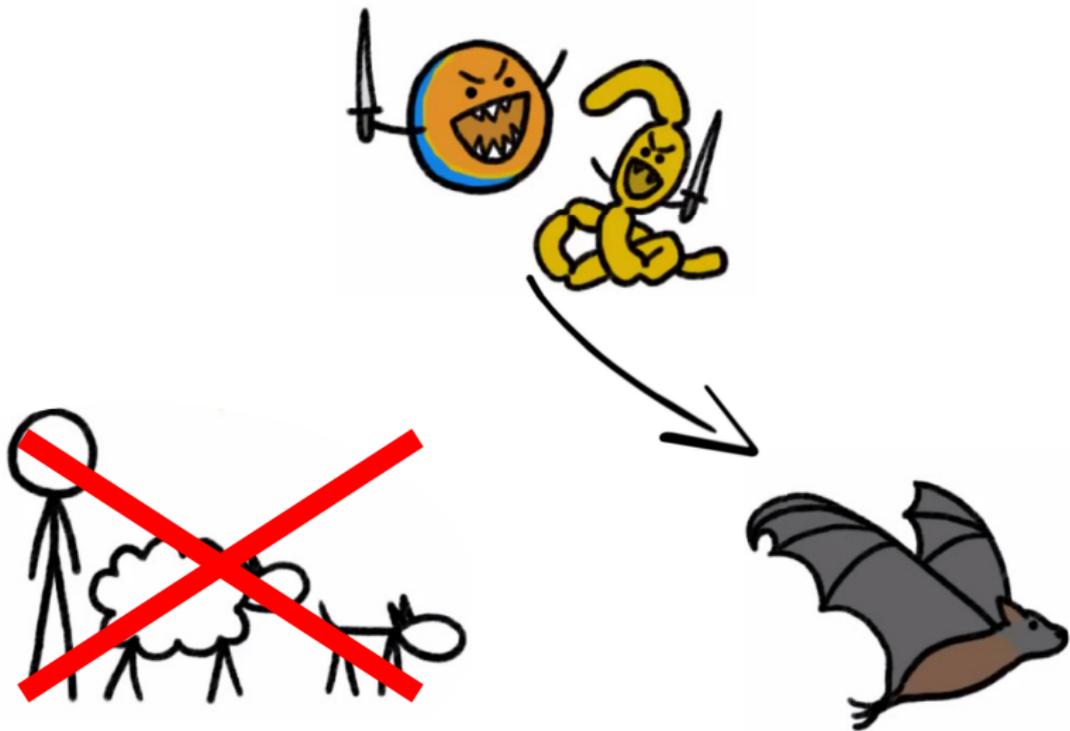
RNA Bioinformatics and
High Throughput Analysis

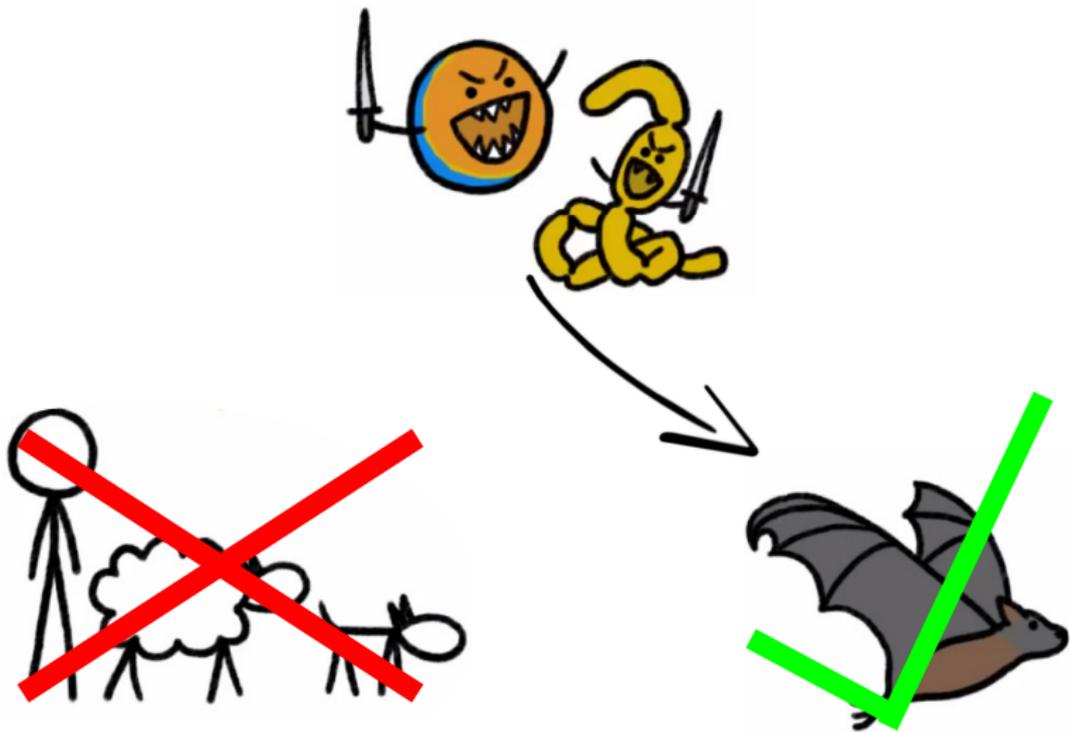
Friedrich-Schiller-University Jena

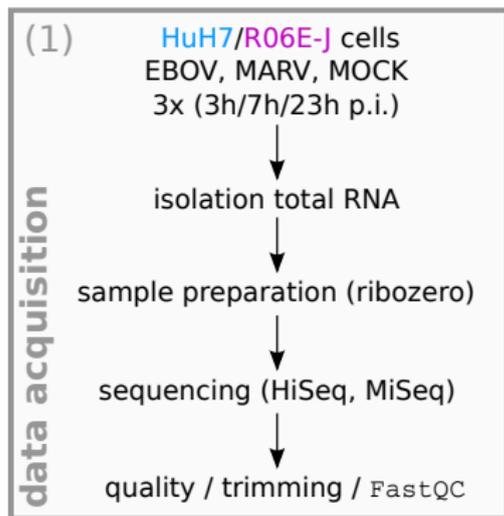
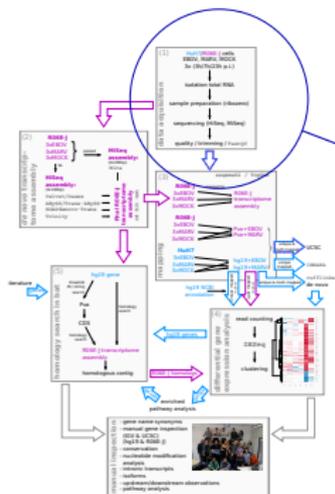
February 19, 2015





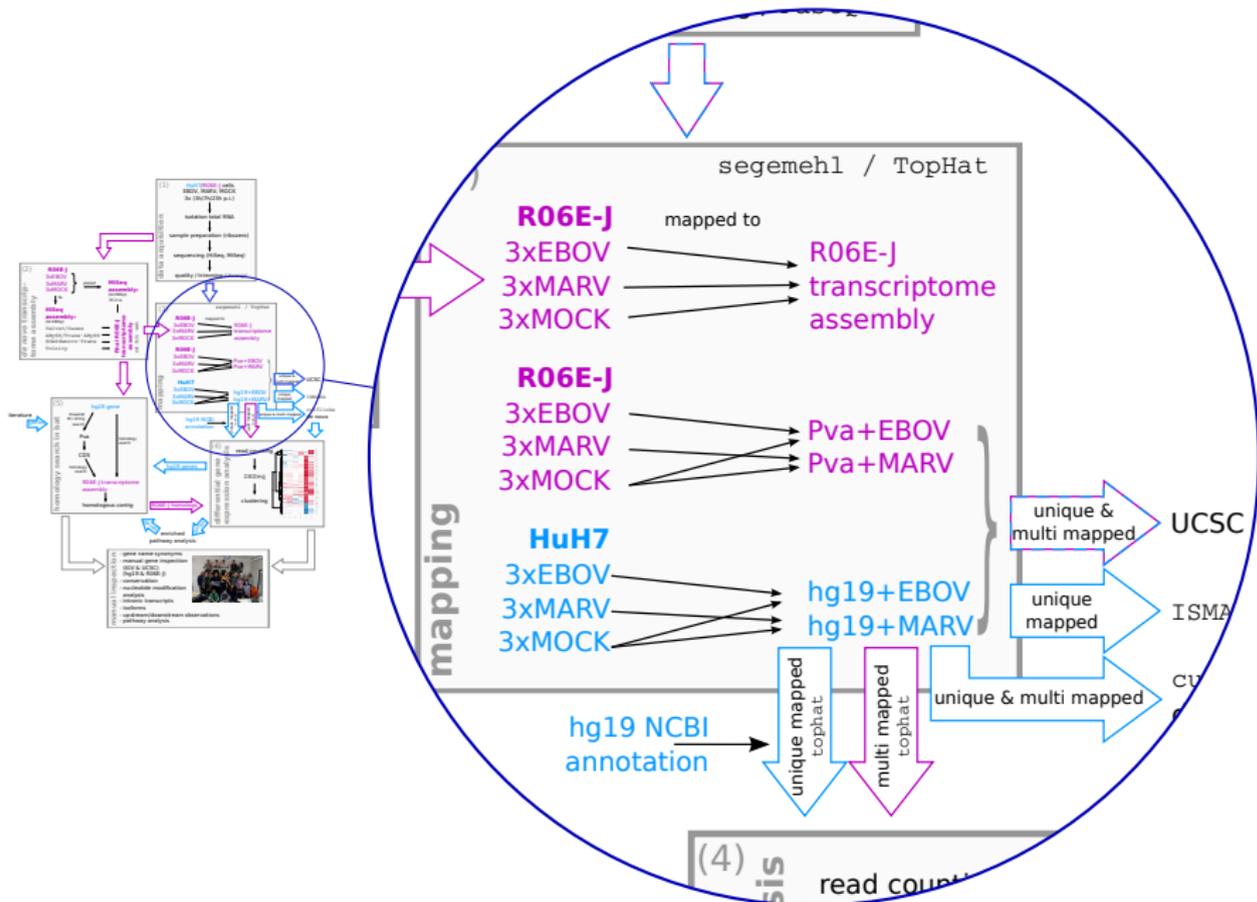


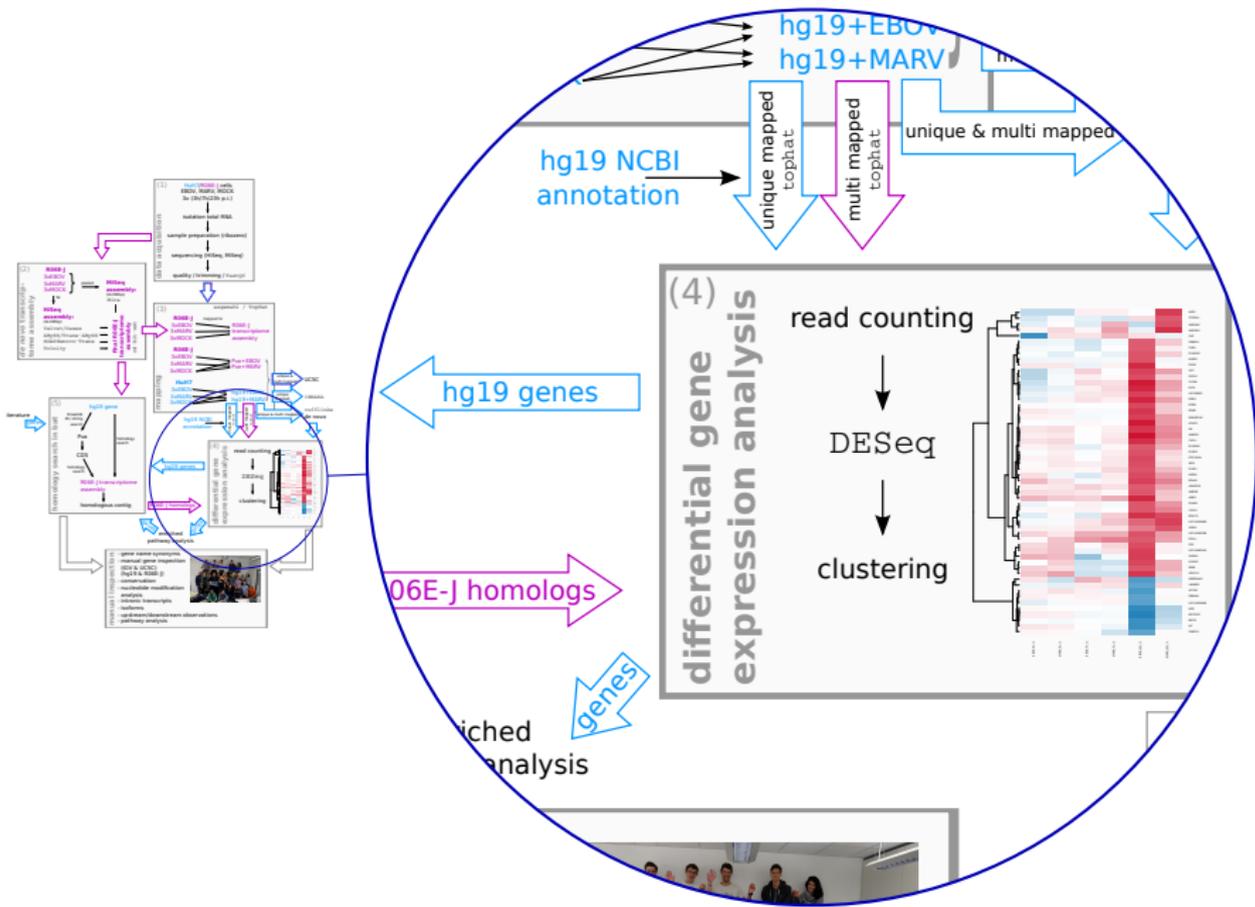


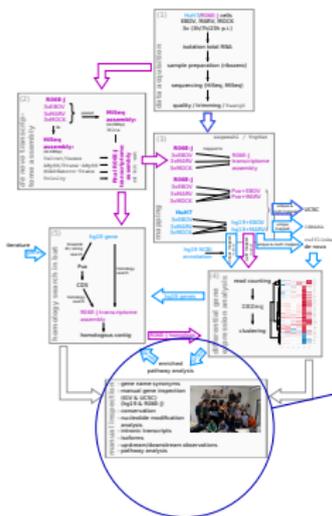


segemehl / TopHat

mapped to







genes

enriched
pathway analysis

genes

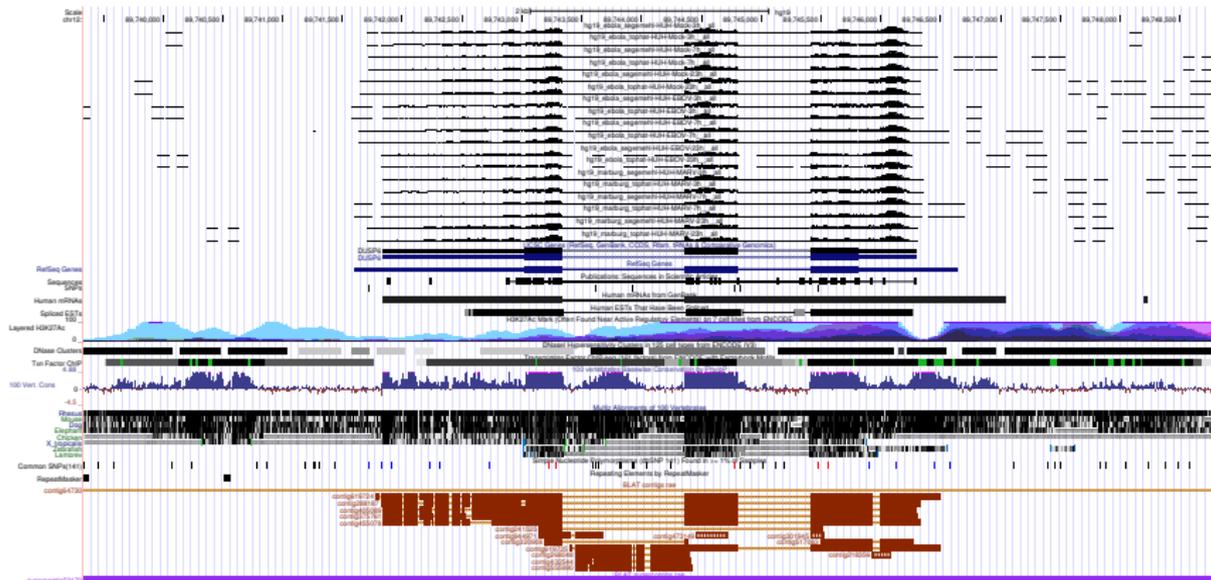
dif
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manual inspection

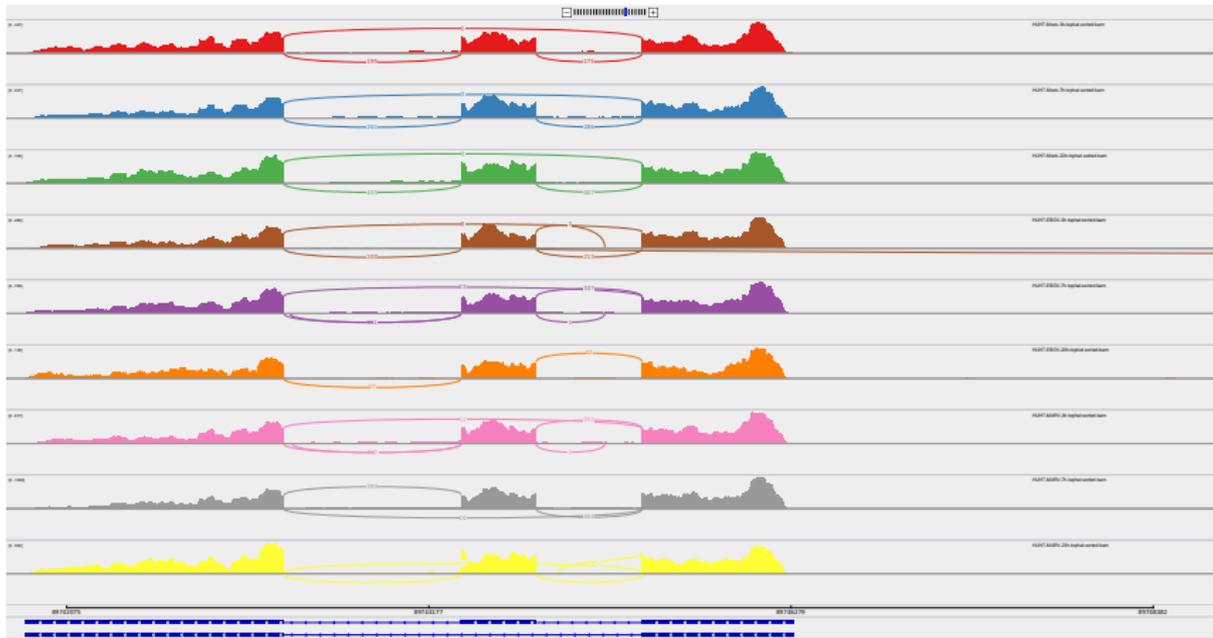
- gene name synonyms
- manual gene inspection (IGV & UCSC) (hg19 & R06E-J)
- conservation
- nucleotide modification analysis
- intronic transcripts
- isoforms
- upstream/downstream observations
- pathway analysis



Manual gene inspection (UCSC)



Isoforms (IGV Sashimi Plot)





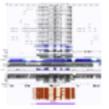
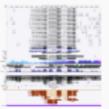
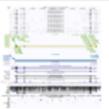




Data resource, >7% of human genes

Show 10 entries

Search All

NAME	SYNONYMS	C3h	C7h	C23h	E3h	E7h	E23h	H3h	H7h	H23h	PDF-file	IGV-Image	Sashimi-Image	UCSC-Image
C11orf181	C11orf181, DUSP_HUMAN, DUSP8, NH_004420, NP_094411, Q13202, Q95558, VHS	31	25	13	30	26	626	44	29	26	pdf		None	
CL100	CL100, DUSP1, HMH1, MKP-1, PTFN10	62	62	40	69	59	1493	89	151	131	pdf			
Dual Specificity Protein Phosphatase 6	DUSP6, Dual Specificity Protein Phosphatase 6, HHS19, MKP3	427	637	745	480	766	138	617	1086	590	pdf			
DUSP10	DUSP10, MKP-5, MKP5	57	40	31	53	44	435	65	78	64	pdf			



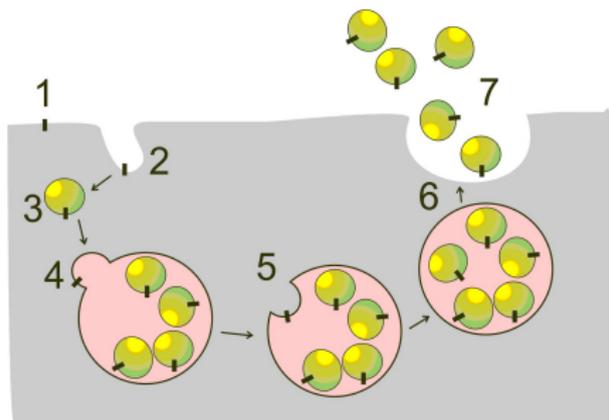
... and all the others!

Miscellaneous/Whiskellaneous

- New Project: RNA-Seq of mouse exosomes
- Exosomes: transport/signaling vesicles secreted by mammalian cells
- contain RNA, proteins, lipids, other metabolites, ...
- mRNA? miRNA? lincRNA? ...

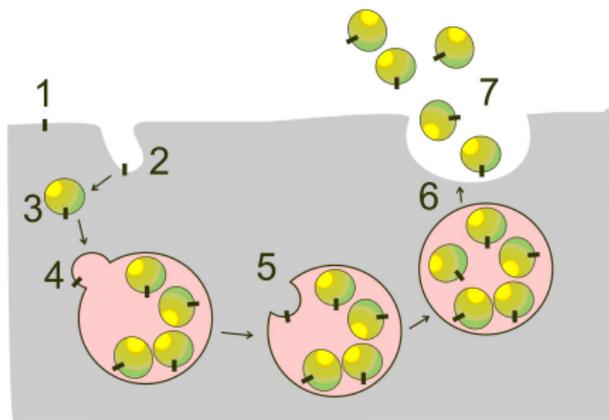
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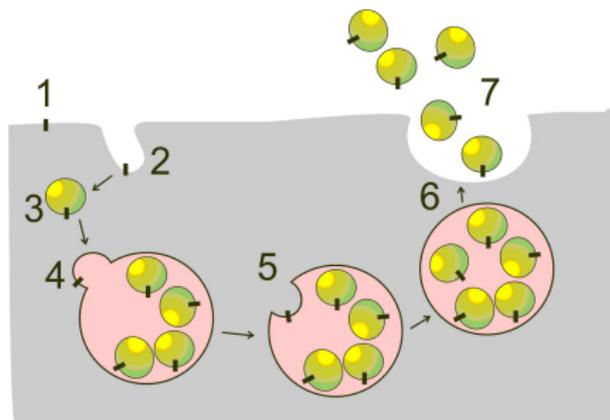
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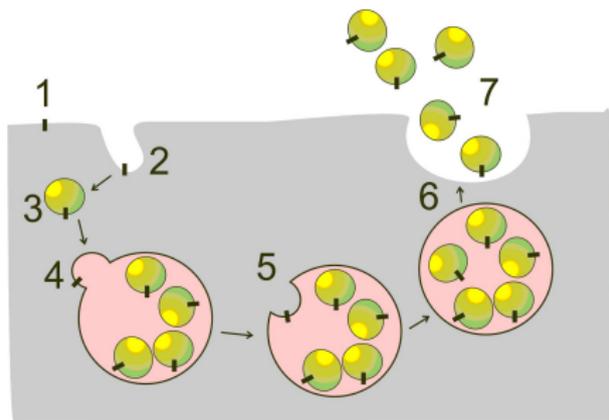
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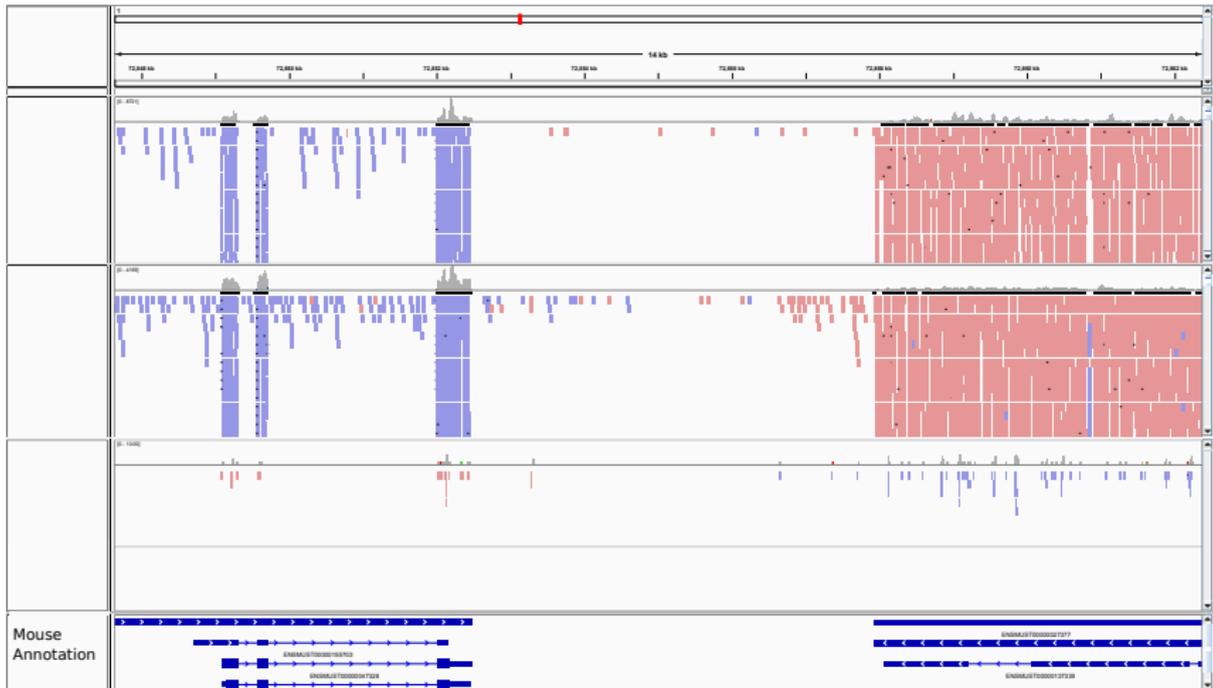
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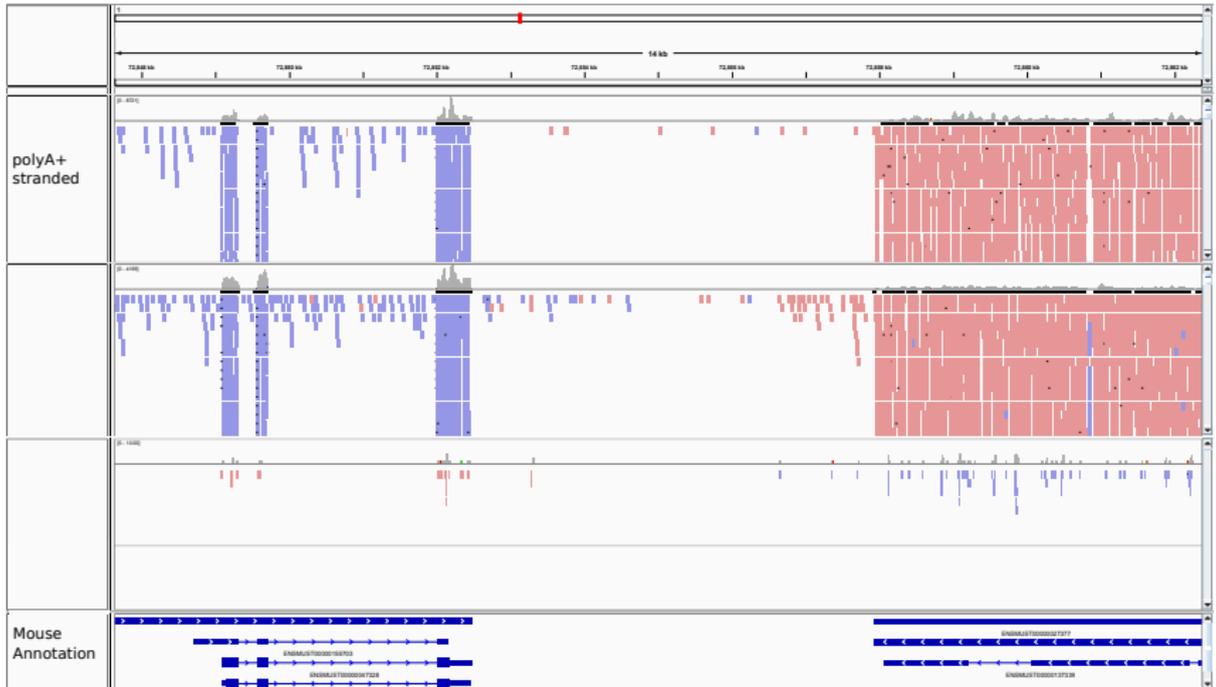


Which protocol for library preparation?

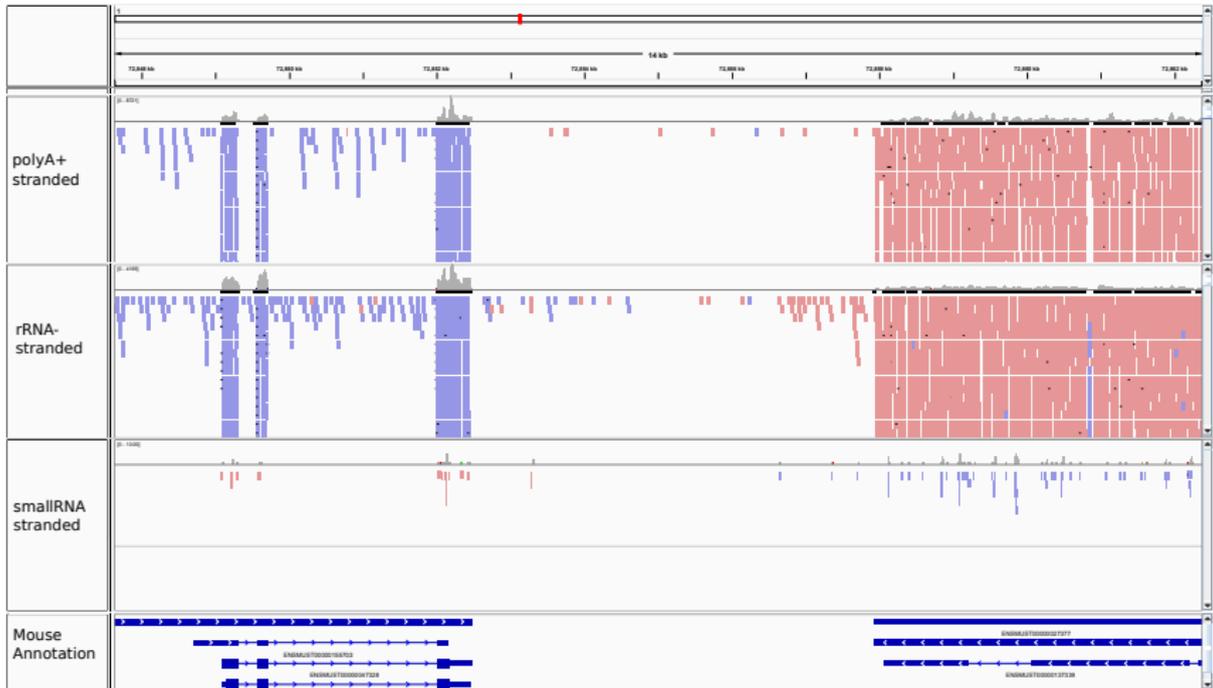
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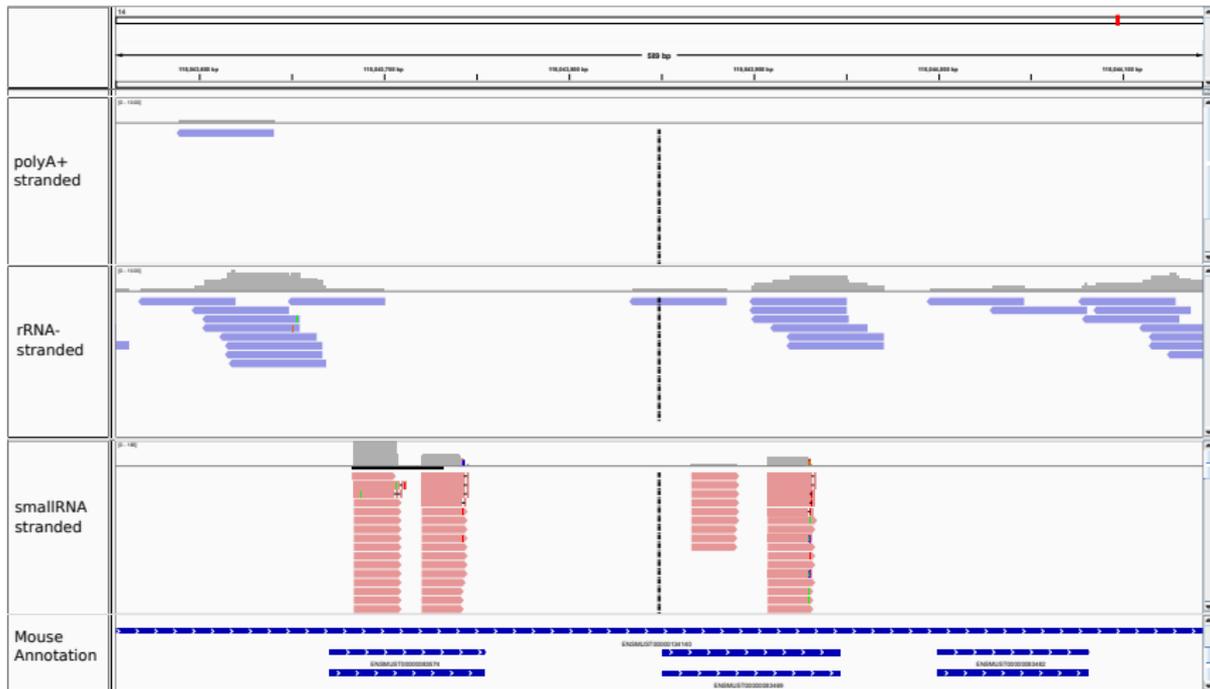


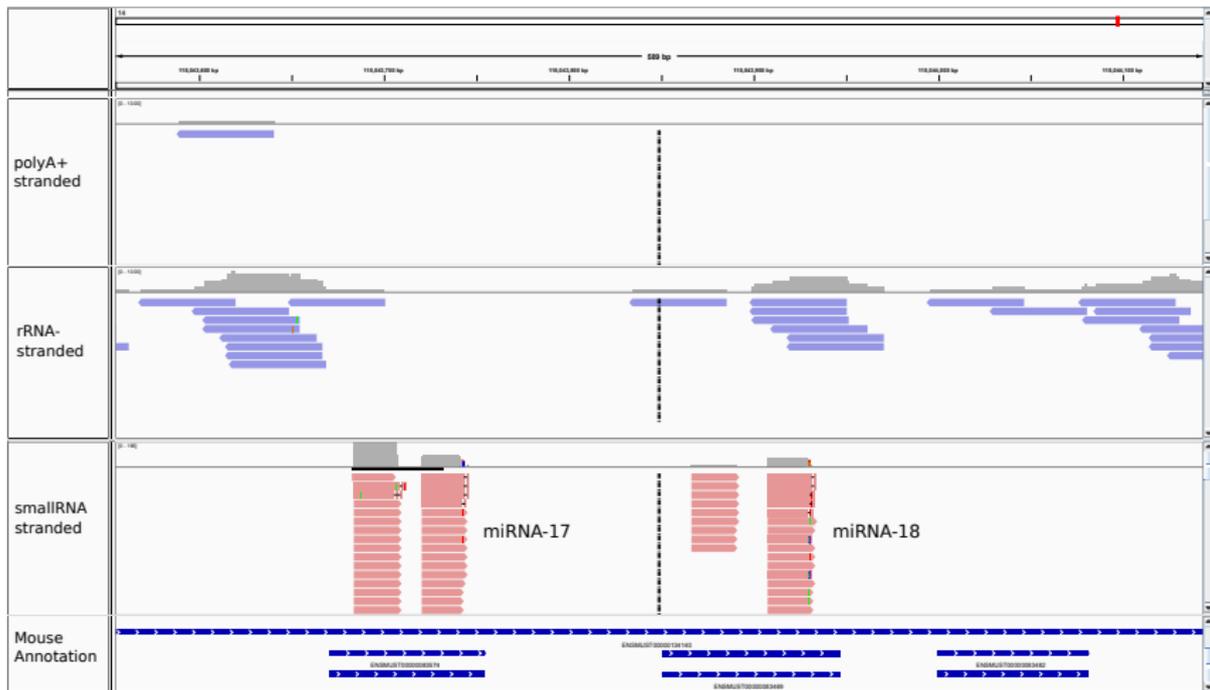
Which protocol for library preparation?



Whiskellanous: Scottish Single Malt Whisky



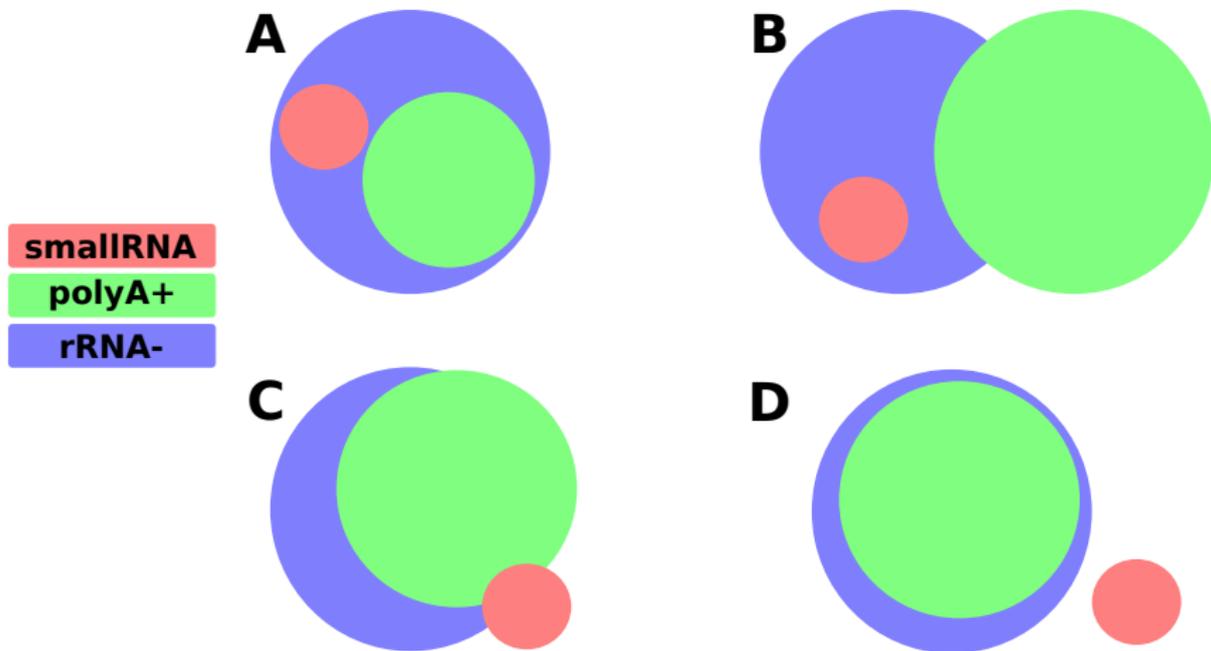




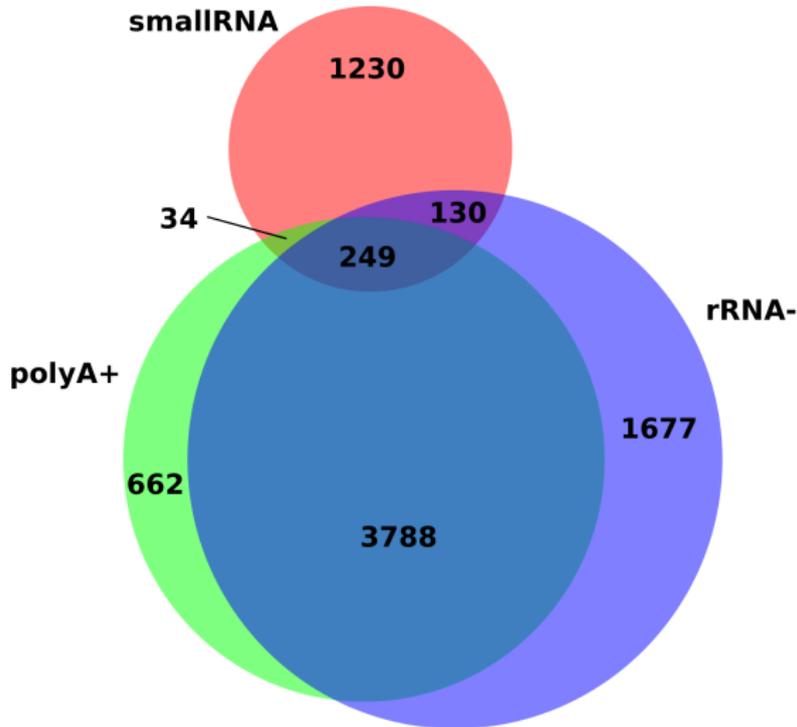
Benromach, 10 years, 43%



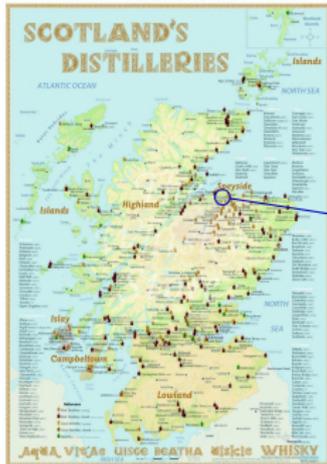
What is the overlap?



Genes detectable with the different protocols



BenRiach Sherry, 12 years, 46%



Fine

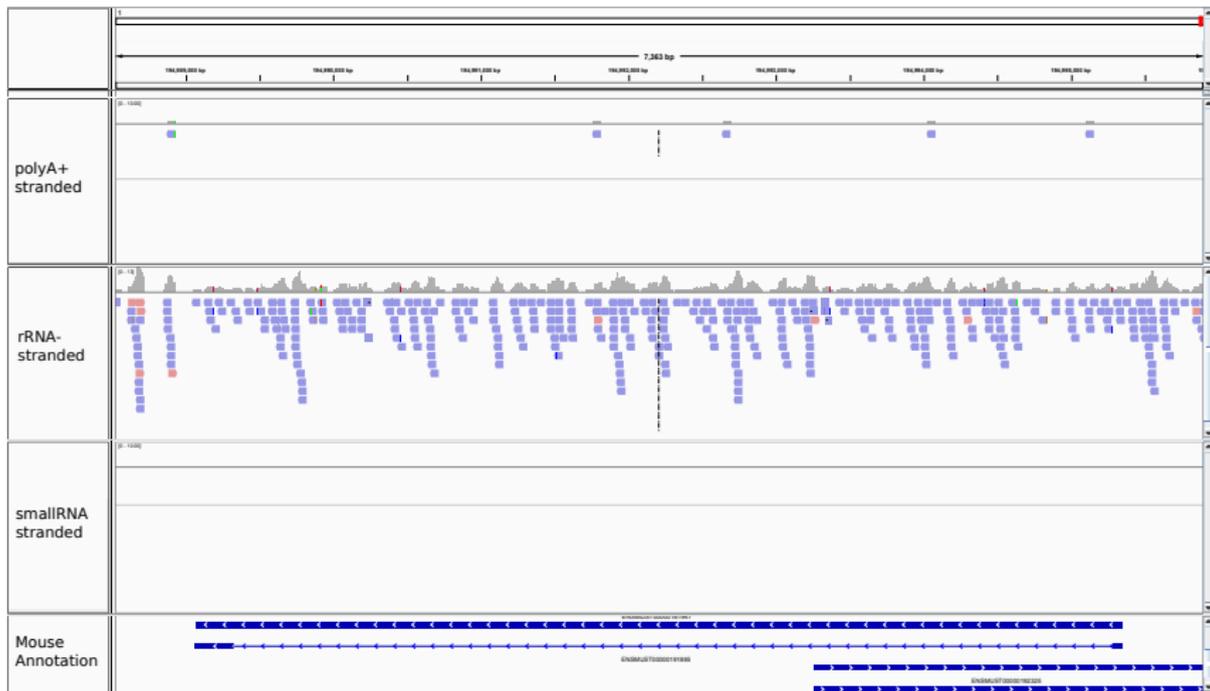
Thanks to Manja and the whole group!

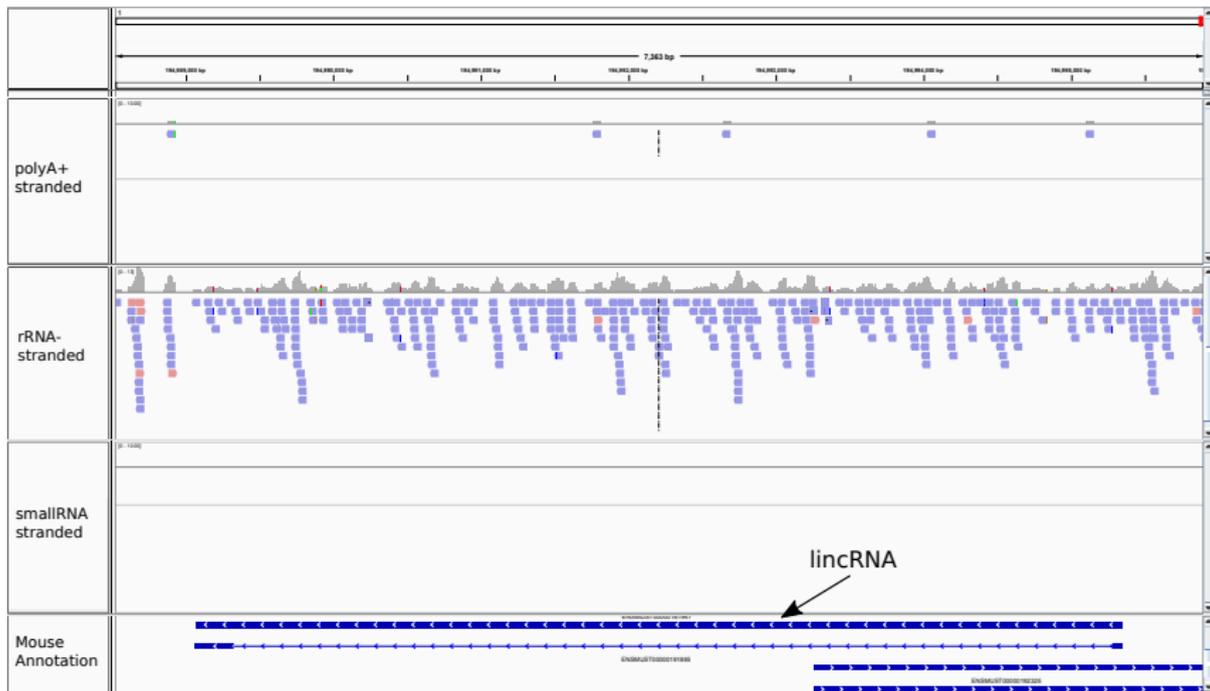


... and you for your attention!

Tomatin Legacy, NAS, 43%







Bonus

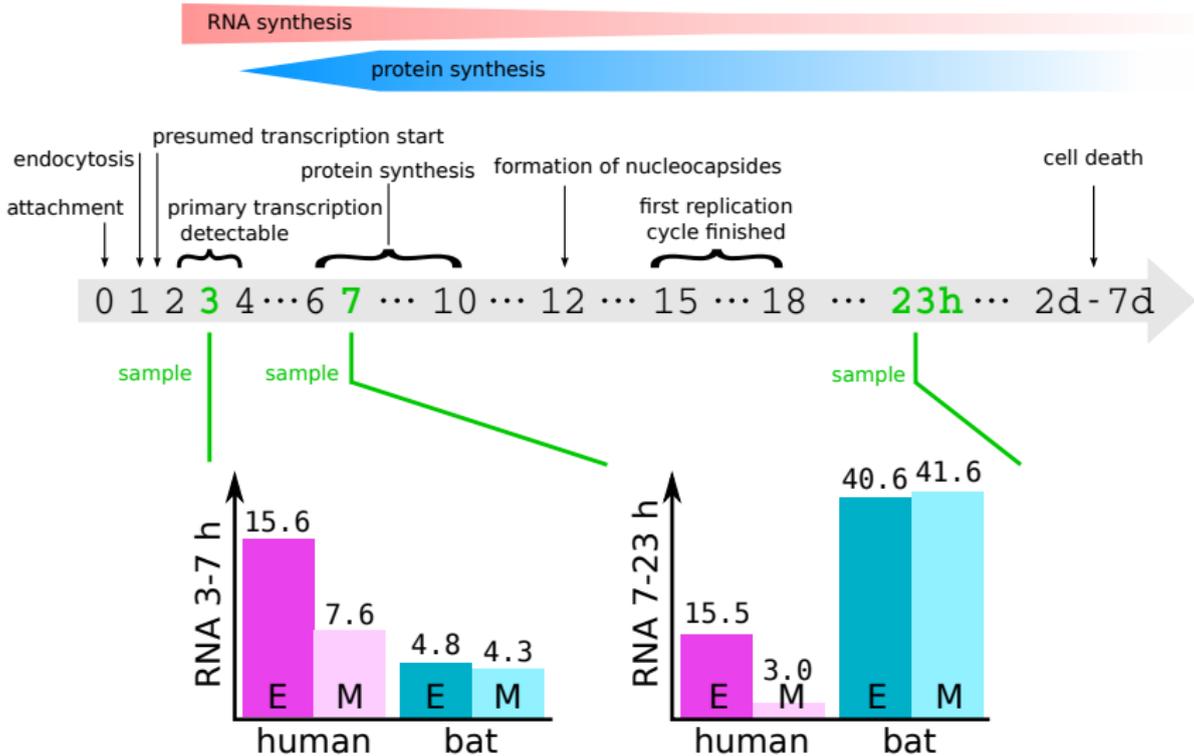
RNA-Seq of bacterial transcripts: rRNA depletion or not?

A: just sequence, only ~50% is rRNA

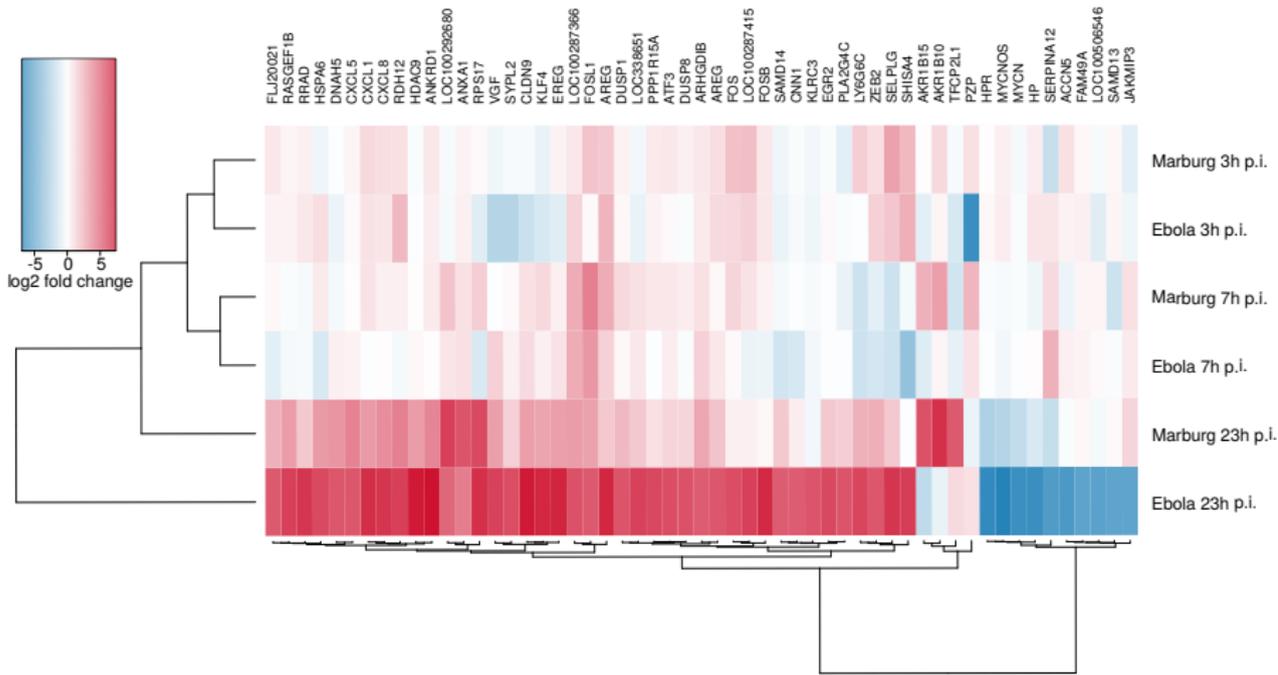
B: ~90% is rRNA, but just sequence deep enough

C: >99% can be rRNA, deplet before sequencing!

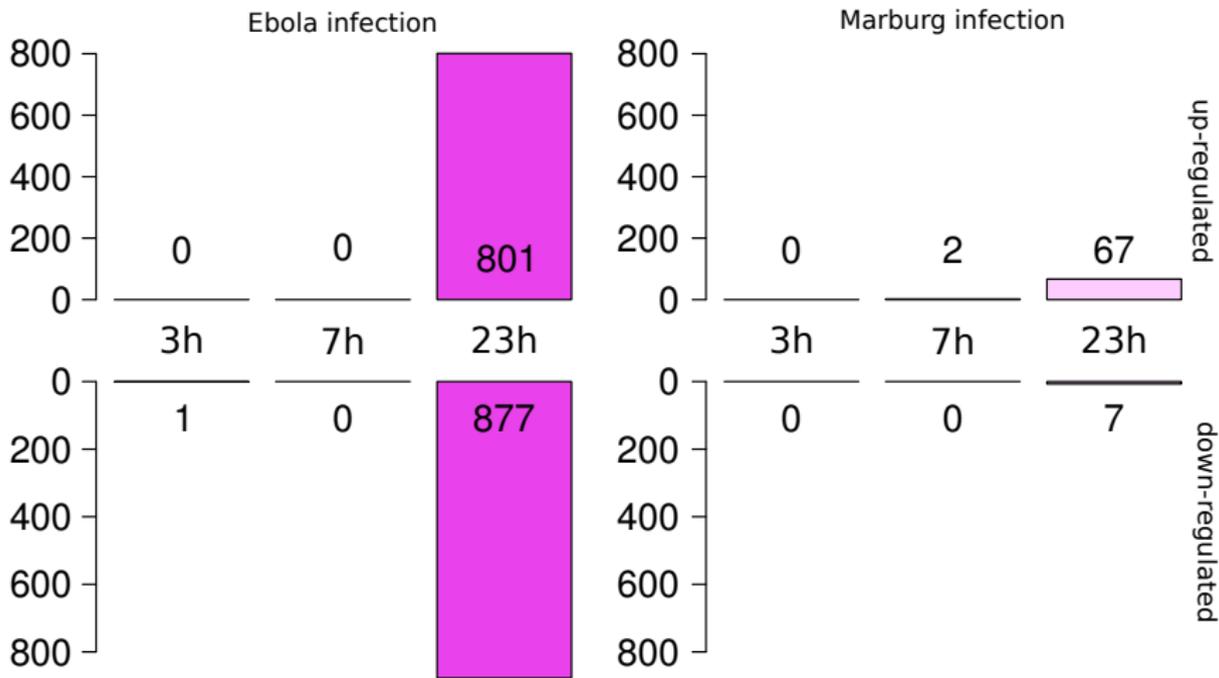
How fast is the virus?



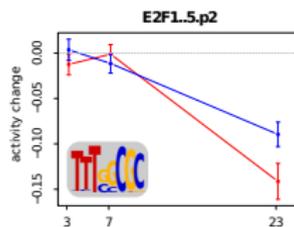
Keyplayers



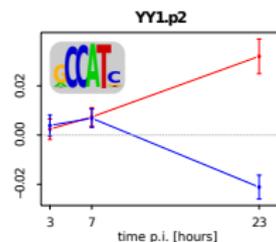
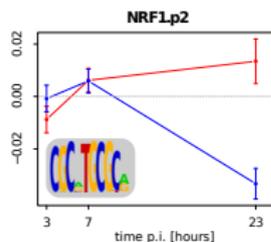
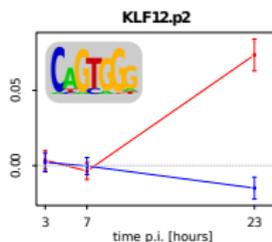
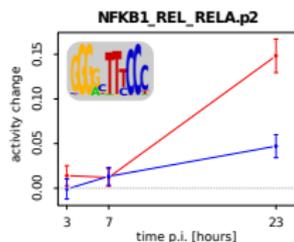
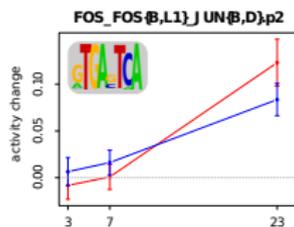
Differential expressed Genes



MARA: Motif Activity Response Analysis



Ebola Top Motifs	Z-Score	Marburg Top Motifs	Z-Score
E2F1.5.p2	5.24	NRF1.p2	4.73
NFKB1_REL_REL.p2	4.36	E2F1.5.p2	4.53
KLF12.p2	4.20	YY1.p2	3.55
hsa-miR-129-5p	3.37	NFY(A,B,C).p2	3.07
PITX1.3.p2	3.26	TFDP1.p2	2.90
TFAP2(A,C).p2	3.23	SP1.p2	2.70
GATA1.3.p2	3.13	ELK1.4_GABP(A,B)1.p3	2.64
SRF.p3	3.12	HNF4A_NR2F1.2.p2	2.61
POU5F1.p2	2.98	hsa-miR-129-5p	2.55
TFAP4.p2	2.86	FOS_FOS(B,L1)_JUN(B,D).p2	2.44



Kingpins during Filovirus Infection

