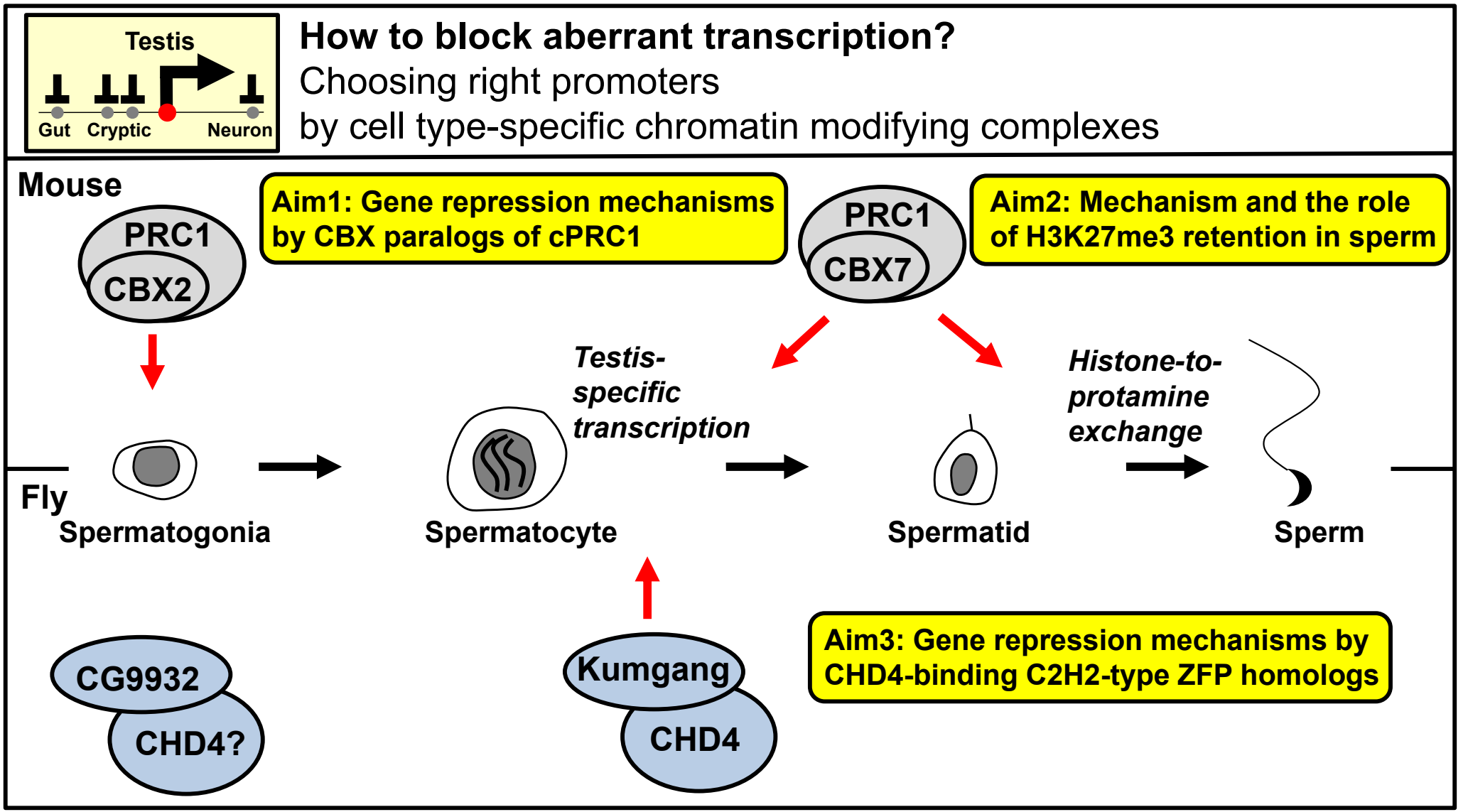
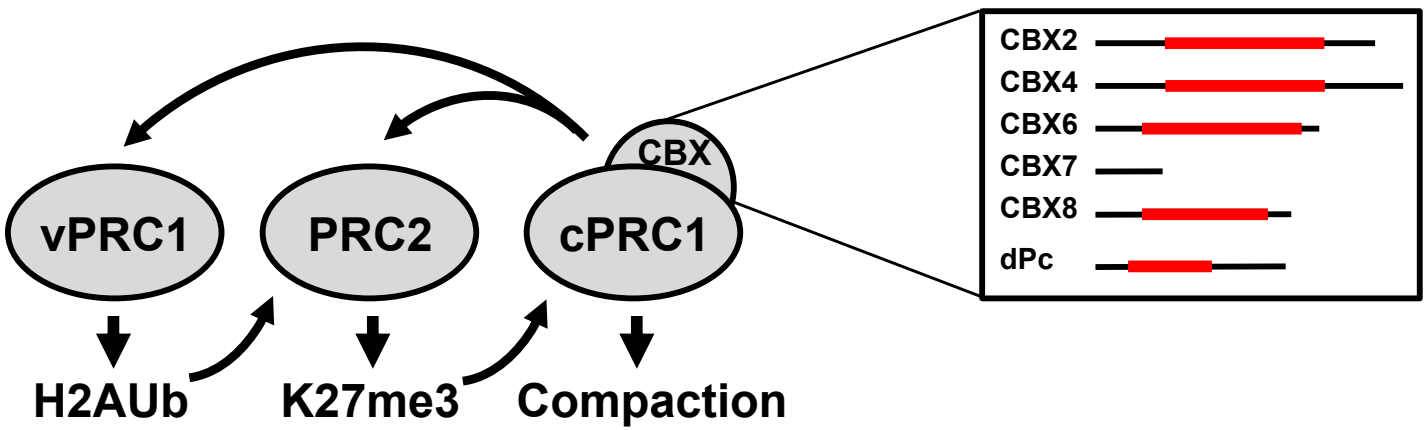
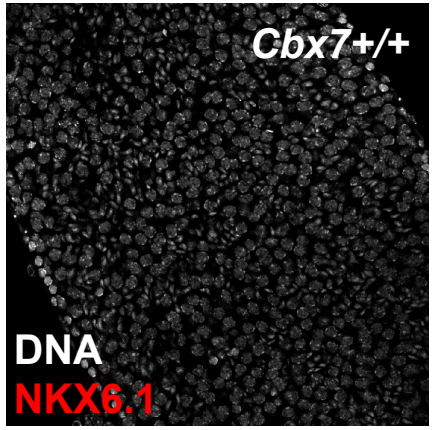
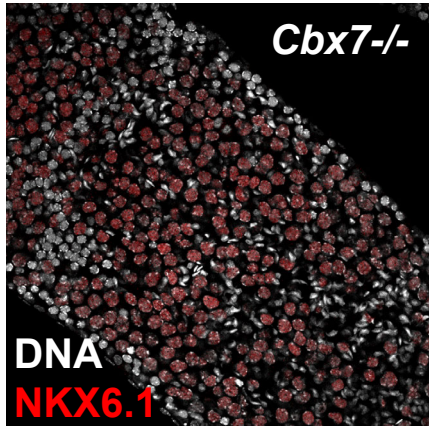

Testis
Gut
Cryptic
Neuron
How to block aberrant transcription?
Choosing right promoters
by cell type-specific chromatin modifying complexes
Mouse
PRC1
CBX2
Aim1: Gene repression mechanisms by CBX paralogs of cPRC1
PRC1
CBX7
Aim2: Mechanism and the role of H3K27me3 retention in sperm
Testis-specific transcription
Histone-to-protamine exchange
Fly
Spermatogonia
Spermatocyte
Spermatid
Sperm
CG9932
CHD4?
Kumgang
CHD4
Aim3: Gene repression mechanisms by CHD4-binding C2H2-type ZFP homologs

Aim1. Gene repression mechanism by CBX paralogs of cPRC1

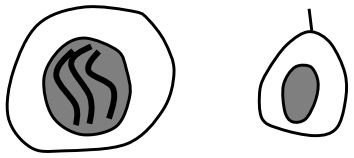






Q) Determinants of gene repression?
Q) Why CBX7 but not other CBX?

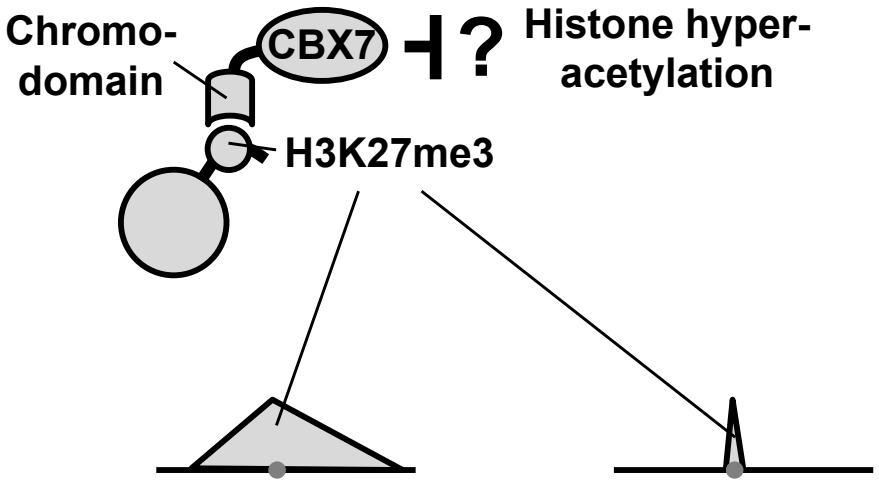
- **Wild type**
- ***Cbx7-/-***
- ***vPRC1-cUbMut***
- ***Cbx7-/-; rescue-CBX7-dTAG***
- ***Cbx7-/-; rescue-CBX2-dTAG***



Measure genome-wide:
vPRC1, PRC2, cPRC1,
H2AUb, H3K27me3,
Compaction

Analyze cellular phenotypes

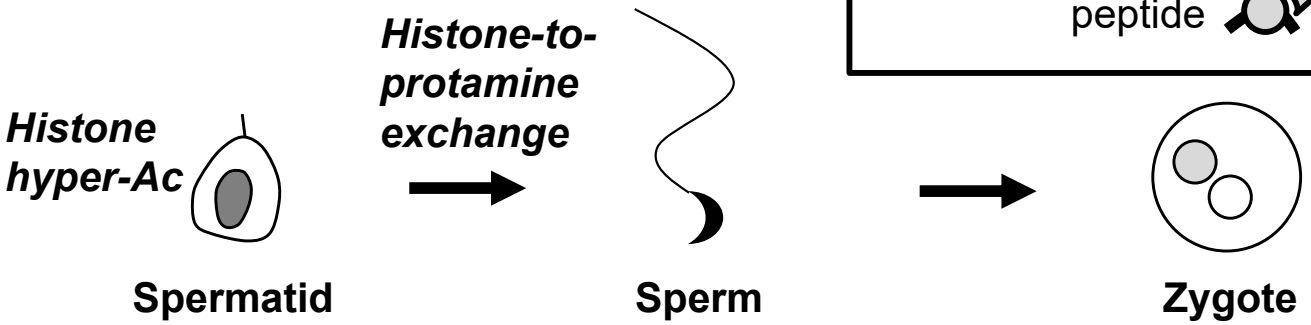
Aim2. Mechanism and the role of H3K27me3 retention in sperm



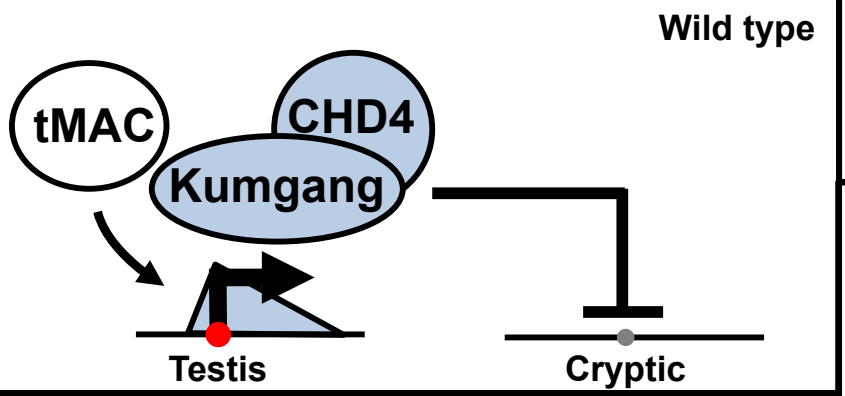
CBX7 in H3K27me3 retention in sperm?
Compare WT vs. Cbx7-/- sperm

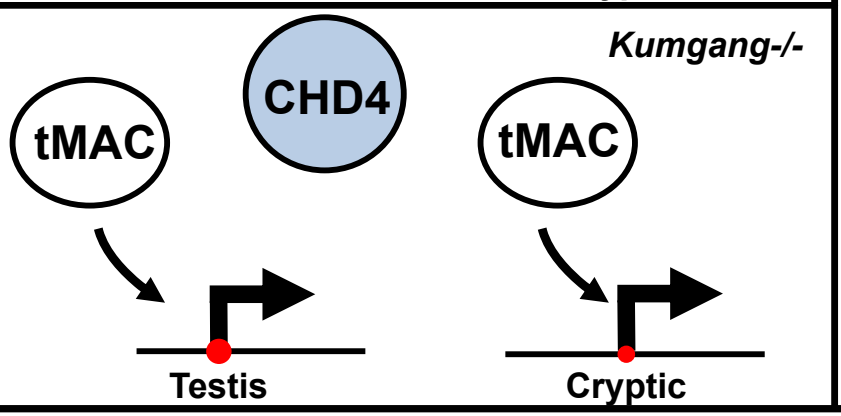
If yes, questions:
1) Histone hyper-Ac at normal H3K27me3 loci?
2) Sperm chromatin structure?
3) Zygotic gene expression & development

If no, H3K27me3 binding protein in spermatids?



Aim3. Gene repression mechanisms by CHD4-binding ZFP homologs





Hypothesis

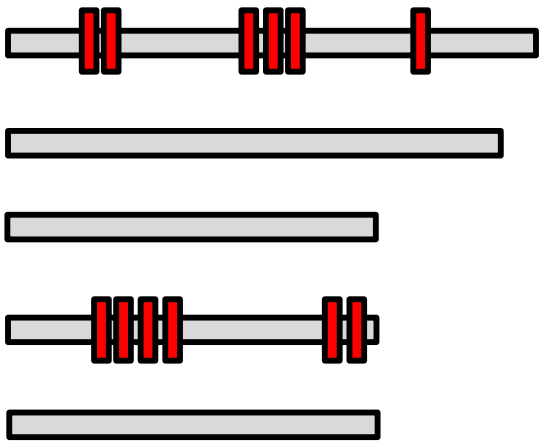
Global disruption of chromatin structure, such as yeast Spt6 mutant (elongation factors)

Approach

Acute-depletion of Kumgang

DD-DD-Kumgang flies
(depletion of Kumgang by TMP withdrawal)

Measure time course
- Gene expression
- Genome-wide CHD4, tMAC binding
- Nucleosome positioning by MNase-seq



Q) Role of ZF in Kumgang
Individual Zf mutant rescue

Q) Role of CHD4-binding ZFPs
Kumgang homolog rescue

Future: isolation of dominant suppressor EMS mutants reverting fertility of *kumgang*