* Intro
  + Reiterate topics of first two talks
  + Review epigenetics/role of transcriptional regulators like REST and chromatin remodelers like G9a

 Glioblastoma

* Background: REST's dual role as tumor suppressor/oncogenic factor
* Is REST expressed in human glioblastoma multiforme specimens? Is there an epigenetic mechanism at play?
  + Recall REST's role in development from Trina's talk
* What is REST's role in the self-renewal and tumorigenic competence of GBM cells *in vitro* and *in vivo*?
  + *In vivo* mouse model: will the delivery of REST-specific shRNA (RNA interference) affect tumorigenic capability?
* Cool: Shows possible epigenetic mechanism (We can target "upstream" of the messy genetic signaling), and a new potential way to prevent/retard the disease progression.

 Huntington's

* Background: REST's role in transcriptional regulation of BDNF and REST's interaction with WT vs. mutant huntingtin
* How does WT but not mutant huntingtin stimulate transcription of BDNF? Dependence on REST binding site
* How does WT huntingtin target REST binding site to promote transcription of BDNF? Cytoplasmic recruitment of REST
* Cool: Epigenetic model of Huntington disease.

 Both of these studies highlight "When REST goes WRONG," when these factors critical for normal development and differentiation of neural cells are hijacked.

 But what about plasticity (in the LTP sense)?

 Cocaine

* Background: switching gears from REST to chromatin remodeler: lysine dimethyltransferase G9a
* Review definition of chromatin remodeling: H3K9 methylation
* Does G9a expression correlate with repeated cocaine administration?
* How does G9a expression (in nucleus accumbens) regulate behavioral response to cocaine? Conditional mutagenesis, viral-mediated gene transfer
* Cool: Histone methylation's role in long-term actions of cocaine

 Epilepsy

* Background: ketogenic diet, glycolisis and genes regulated by REST
* How does 2DG exert antiepileptic effects?
* How does 2DG affect transcriptional regulation to reduce BDNF and TrkB gene expression?
* Cool: Epigenetic mechanism for potential dietary solution to untreatable epilepsy

 Summary

* Epigenetic machinery is involved in proper development and plasticity, and when it goes wrong disorder and disease reign.
* Targeting epigenetic machinery provides potential therapeutic treatments.