# Gene regulation in embryonic development

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# Propositions

Accompanying the thesis

**Gene regulation in embryonic development**

1. DNA methylation is a dynamic process that occurs independently on each allele and has effects on transcription *in cis*.

   *Chapter 1 of this thesis.*

2. Without single-cell RNA-sequencing it would have been impossible to sub-classify nephron progenitor cells.

   *Chapter 2 of this thesis.*

3. mRNA levels are a bad proxy for protein levels in cell populations that are out of steady state.

   *Chapter 3 of this thesis.*

4. Modelling multi-omics datasets can identify functional micro-RNA and gene interactions without the need for biasing perturbations.

   *Chapter 4 of this thesis.*

5. Merging histopathology with spatially resolved transcriptomic profiles can prove to be a missing link in disease biology, diagnostics and treatment. However, higher accessibility to these methods for smaller research groups is needed for this to fully come to fruition.

   Vickovic *et al.*: Nat Methods **16**, 987-990 (2019).

6. Extracting latent factors from multi-omics makes complex biology more interpretable, but pays for this by being more abstract.

   Argelaguet *et al.*: Mol Syst Biol **14**, e8124 (2018).

7. Recent advancements in imaging techniques coupled with new computational methods allow for a more detailed study of mouse development and may inspire a new generation of developmental microscopists.

   McDole *et al.,*: Cell **175**, 859-876 (2018).

8. Discovering new layers of the regulatory landscape of embryonic development has become so difficult, that teams with numerous different and highly specialized skills have become a necessity. This puts strain on the peer review system, as only a few reviewers might not cover the breadth of expertise required.

   Mateo *et al.,*: Nature **568**, 49-54 (2019).

9. The era of the lone scientific genius has long passed, so we have to adjust the evaluation of scientists accordingly and place a much higher emphasis on collaborative projects.

10. Code sharing has to become the standard in order for science to be considered reproducible.

11. The increased throughput and reproducibility that robots can provide to the lab will transform biological experimentation in the future.

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Leiden, May 19 2021