

E.
Segmentation
(in embryological development)

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Vertebrae

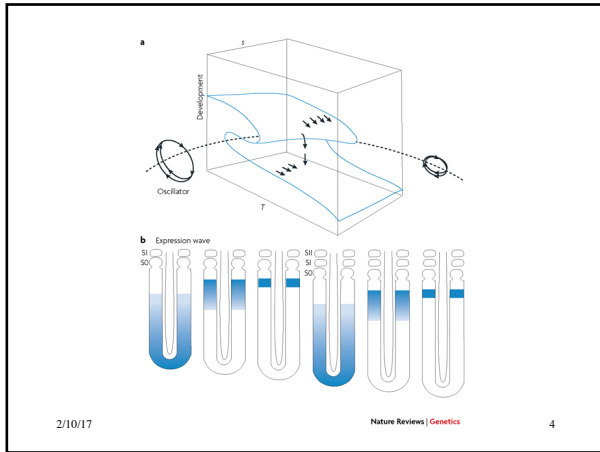
- Humans: 33, chickens: 55, mice: 65, corn snake: 315
- Characteristic of species
- How does an embryo “count” them?
- “Clock and wavefront model” of Cooke & Zeeman (1976).

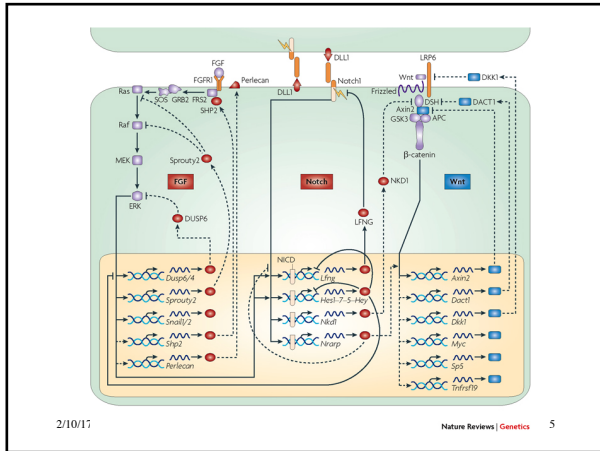
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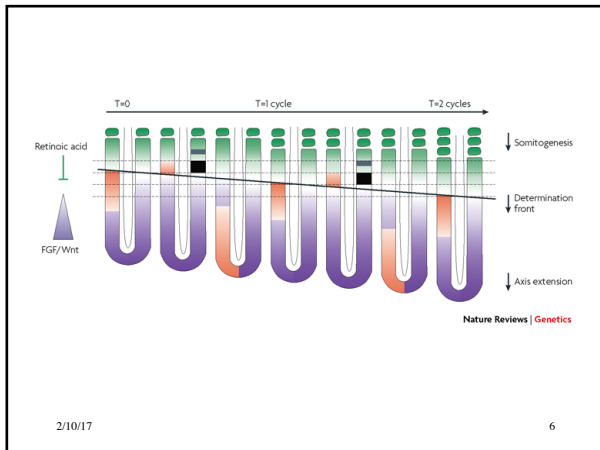
The diagram illustrates the longitudinal axis of an embryo. At the top is the **Head**, containing the **Neural tube** and **Neural folds**. Below the head is the **Head mesoderm**. Further down are the **Otic vesicle** and **Somites**. The **PSM** (Presomitic Mesoderm) is shown as a region of **Somite formation**, **Rostral-caudal patterning**, and **Segmental determination**. At the bottom is the **Tail bud**, which is the site of **Paraxial mesoderm production** and **Axis elongation**.

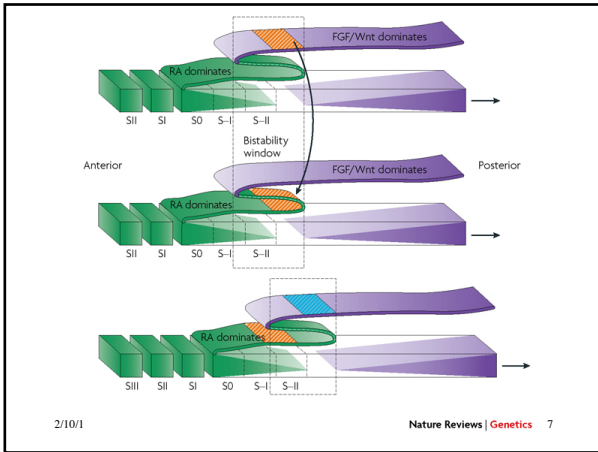
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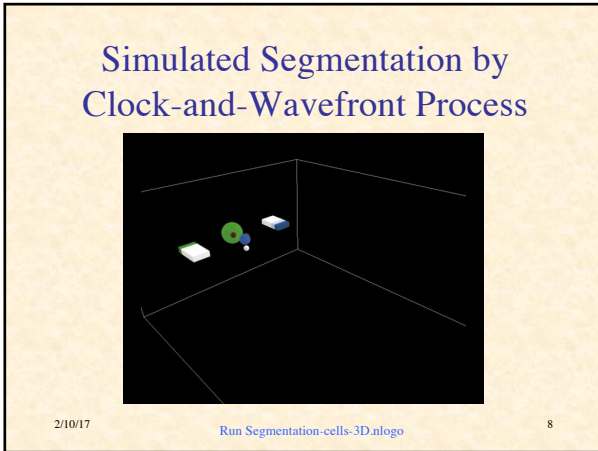
Nature Reviews | Genetics

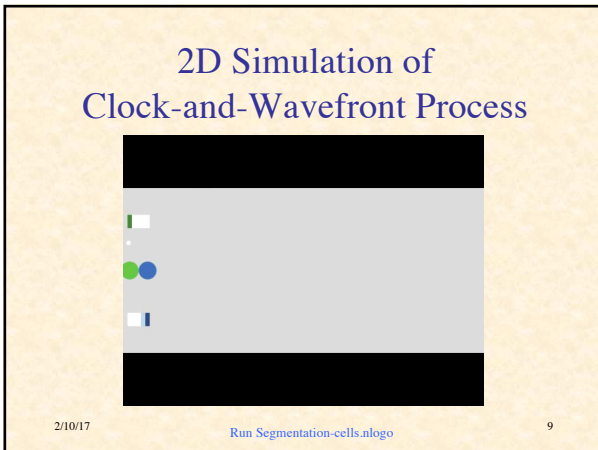


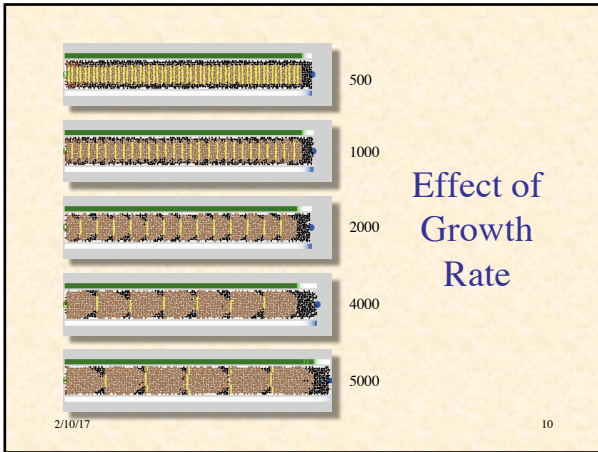













NetLogo Simulation of Segmentation

[Run Segmentation.nlogo](#)

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Segmentation References

1. Cooke, J., & Zeeman, E.C. (1976). A clock and wavefront model for control of the number of repeated structures during animal morphogenesis. *J. Theor. Biol.* **58**: 455–76.
2. Dequéant, M.-L., & Pourquié, O. (2008). Segmental patterning of the vertebrate embryonic axis. *Nature Reviews Genetics* **9**: 370–82.
3. Gomez, C., Özbudak, E.M., Wunderlich, J., Baumann, D., Lewis, J., & Pourquié, O. (2008). Control of segment number in vertebrate embryos. *Nature* **454**: 335–9.

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