Mesoderm formation:
Segmentation
1. Paraxial mesoderm is laid down sequentially by the retreating primitive streak.

2. An oscillation of gene transcription generates each somite pair in sequence.

3. This pulsatile pattern is initiated in the somite precursors/presomitic mesoderm.

4. Coordination of the segmentation mechanism (clock cycling) is dependent on Notch-1 signaling. Notch is a transmembrane receptor that recognizes two transmembrane ligands - Serrate and Delta. KO of Notch, its ligand or elements of its down-stream cascade result in loss of segmentation.
Generation of form and diversity: homeotic transformations
Positional information:
Transplantation of somites

Summary:
1. Somites establish body segmentation.
2. Somite has 3 separate compartments.
3. Differential A/P properties of the somite result in segmentation of vertebral column and peripheral nervous system.
4. Overlapping patterns of HOX gene expression result in somites with individual characteristics.
5. Positional information is present in somites prior to epithelial-mesenchymal transformation.