<Further Development 19_01>

Notch Signaling and Somite Formation

One of the key agents in determining where somites form is the Notch signaling pathway (see Aulehla and Pourquié 2008). When a small group of cells from a region constituting the posterior border at the presumptive somite boundary is transplanted into a region of presomitic mesoderm that would not ordinarily be part of the boundary area, a new boundary is created. The transplanted boundary cells instruct the cells anterior to them to epithelialize and separate. Nonboundary cells will not induce border formation when transplanted to a nonborder area. However, these cells can acquire boundary-forming ability if an activated Notch protein is electroporated into them. Morimoto and colleagues (2005) have been able to visualize the endogenous level of Notch activity in mouse embryos and have shown that it oscillates in a segmentally defined pattern. The somite boundaries were formed at the interface between the Notch-expressing and Notch-nonexpressing areas. The expression pattern of *Hairy1*—a segmentation gene regulated by Notch activity—at the anterior of the presomitic mesoderm at the end of each cycle of expression was exactly where the transplantation experiments showed Notch expression to be important (see textbook Figure 19.15).

Literature Cited

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