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MICROBIOME

Expanding through the microbiota

The role of the host-associated microbiota in promoting the development of the animal gastrointestinal tract is well established; however, the influence of resident microorganisms on the development of other digestive organs has remained elusive. In this paper, Hill *et al*. show that the intestinal microbiota is required for normal expansion of the pancreatic β-cell population in zebrafish during early larval development.

In the first few days after hatching, the number of insulin-producing β-cells in zebrafish larvae increases steadily; by contrast, the authors found that germ-free zebrafish maintained the same number of β-cells as they had before hatching. Monocolonization of the germ-free animals with *Aeromonas* spp. isolated from the zebrafish gut restored their β-cell populations, whereas other species such as *Vibrio* spp. did not rescue this phenotype. Importantly, the authors were able to identify a previously unknown secreted protein that is produced by *Aeromonas* spp. that induced β-cell expansion, which they termed β-cell expansion factor A (BefA). Moreover, the data suggest that BefA causes β-cell expansion by increased cell proliferation, but it remains to be determined whether this proliferation occurs in progenitor cells, mature β-cells or both.

> “the intestinal microbiota is required for normal expansion of the pancreatic β-cell population”

Finally, homologues of BefA produced by members of the human gut microbiota also induced β-cell proliferation in germ-free zebrafish, which suggests that this factor has a conserved role in early development. In summary, this study reveals the important role of the microbiota in organ development beyond the intestine.

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ORIGINAL ARTICLE Hill, J. H. *et al.* A conserved bacterial protein induces pancreatic beta cell expansion during zebrafish development. *eLife* **5**, e20145 (2016)