Porcine Organogenesis

INTRODUCTION

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The pig (*Sus scrofa*) is a long-time standard model organism for demonstrating mammalian organogenesis. It is agriculturally important and accessible worldwide, which makes it available in sufficient numbers in the laboratory. An added advantage is that compared to smaller laboratory mammalian models such as the mouse, the sectioned pig embryo provides a relatively straightforward orientation, making it easy to identify structures and navigate through organ systems during tracing of sections. Because early developmental porcine stages are strikingly equivalent to comparable stages of human embryos, many important embryological studies have used the pig as a significant research model to study human birth defects. Thus, studying porcine embryology is a window to understanding human development. With the advent of xenografts, such as when a pig heart valve is transplanted into a defective human heart to repair it, understanding porcine organogenesis is essential. Comparative genome analyses can be used to analyze diseases of pigs that relate to humans.

Earlier chapters in this Atlas have addressed stages of mammalian development up to neurulation. Chapter 12 focuses on pig embryos at selective stages that share an overall similarity to 72–96 hour chick embryos and early stage human embryos. Consider that while selective embryonic stages are demonstrated in this Atlas, development is a dynamic process. This chapter assumes familiarity with terms in Chapters 9–11. Pig embryos are traditionally identified according to their crown-rump length rather than their number of somites or days of development (Table A.11). The **crown** refers to the highest point of the head (usually above the mesencephalon), and the **rump** is the lowest point on the trunk.

As described in Chapter 2, embryos are typically studied as whole mounts or sections. Due to their thickness, intact pig embryos to be used for whole mounts are first stained and cleared prior to mounting on slides, so that the epidermis and organs are relatively transparent. This allows visualization of both external and internal structures. Care must