Mouse development
From oocyte to stem cells
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This is a really good book for those who love developmental biology: young fellows at the beginning of their careers, esteemed professors, historians of science or fully active leading researchers. The mouse is THE animal model, as it was, crucial for the advancements of knowledge in any of the life science fields. This idea originates within the beginning of the last century (1901-1908) when William Bosworth Castle studied Granby mice (for the detailed and interesting story about the waltzing mice, please visit this webpage: www.informatics.jax.org/morsebook/chapters/morse1.shtml) and continued in 1909 when DBA, the first inbred strain, was created. This achievement was so important that the British geneticist Hans Gruneberg let this statement: *The introduction of inbred strains into biology is probably comparable in importance with that of the analytical balance in chemistry*. Few years later, in 1915, the first linkage study was done while in 1929, the noteworthy Jackson Laboratory was founded in Bar Harbor (Maine, USA). Many other paradigmatic studies for the life sciences occurred: the first transgenic mouse (created by pronuclear injection of fertilized eggs) was created in 1980, the first murine embryonic stem cell line in 1981, the introduction of the SCID mouse strain in 1983, the first knockout mouse in 1987, the first cloned mouse done by Ryuzo Yanagimachi in 1998 (in 1979 Karl Illmensee and Peter Hoppe claimed to have cloned mice by transplanting the nuclei of mouse embryo cells into mouse eggs but, to be fair, an international committee headed by David Solter, reached the final conclusion that this claim was just fake) to the sequence of the mouse genome in 2002.

More than a century of intensive researches in the field of physiology, reproduction and development have finally consecrated the mouse as the animal model par excellence. There are many reasons for that: high fertility rate (a female enters the estrus reproductive phase every four days and can deliver even more than 15 pups), short gestation (19-20 days), genetic variations, susceptibility to diseases (researchers studied, and still do, many human diseases using a mouse model. This should be considered by those fundamentalist activists of the anti-vivisectionist league!). On this regard, I would like to quote Sara Reardon's comment published on January 13th in *Nature* about the creation of the first mouse model of the Middle East respiratory syndrome (MERS) that killed 77/180 people who contracted it: …*the MERS has so far eluded researchers. But they have now created the first mouse model of the disease, which could enable faster testing of drugs and vaccines. The method used to make mice susceptible to MERS might also provide a quick way to study future pandemic viruses in mice*.

This is the point those fundamentalists have to get!

Older books totally devoted to the mouse, like *The Biology of the house mouse*, edited by R.J. Berry in 1981 and the *Genetic variants and strains of the laboratory mouse*, edited by Antony G. Searle and Mary F. Lyon in 1981, paved the way to the present *mouse bible* so meticulously edited by Jacek Z. Kubiak (Institute of Genetics and Development of Rennes, France) who was able to attract leading scientists to cover different aspects of the mouse developmental biology: from unfertilized oocytes through the state-of-the-art illustration of embryonic and adult stem cells, to the aging in the mouse and rejuvenation through iPSc. As the editor wrote in his preface: *Most scientific achievements that have had an important impact on the understanding of basic mechanisms governing embryo development in humans originated from mouse experimental embryology. Stem cell research, which now offers the promise of regenerative medicine, began with the derivation of mouse embryonic stem cells. One of the authors of this pioneering research - Martin Evans - was awarded the Nobel Prize in Physiology or Medicine in 2007*. Other Nobel moments have been marked by the mouse scent, notably the 1951 award to Max Theiler for his studies on the yellow fever transmission.

Some of the opening chapters (21 in total) cover all of the intriguing details of the oocyte's Biology from gene expression control (5 chapters) to the oocyte-to-embryo transition (2 chapters): the oocyte is painted here like a miniature, wonderfully organized laboratory of molecular biology. One interesting issue covered by this book regards one of the most controversial aspects of the mouse (as well as other mammals) embryonic development: all the *rearrangements* that lead to the formation of a viable blastocyst, here presented in 5 different ways (5 different chapters). I really appreciate the efforts to illustrate one topic from different points of view to give the reader an overall idea of this particular phenomenon. As the editor wrote in the preface, the independent views presented: …..*emphasized different aspects of processes leading to the blastocyst formation. However, despite their conclusions diverge, they share several important common points which, I hope, will allow to develop a cohesive vision*. Well done! Other chapters are focused on the role played by stem cells in the formation of selected organs (from ecto-, meso-, and endoderm-derived tissues). At this regard, I really appreciate the chapter written by Zoe Durke and colleagues, *Cellular reprogramming during mouse development,* because it emphasizes the role of stem cells in transdetermination and transdifferentiation in selected organs (developing esophagus and lung; liver to pancreas in Hes 1 knockout mouse, just to mention few examples) with very nice educational color illustrations. The final chapter, devoted to mouse aging and rejuvenation (through the production of iPS from aged somatic cells), sounds like a metaphor for the mouse life cycle.

In conclusion this book offers an up-to-date journey of mouse development, from the beginning (oogenesis) to the end (aging). A must-have for developmental biologists!

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