



人类胚胎学图谱

ATLAS OF HUMAN EMBRYOLOGY

主编 / 刘慧雯



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ATLAS OF
HUMAN EMBRYOLOGY

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主审简介



金连弘, 1946年9月出生。哈尔滨医科大学教授, 博士生导师, 组织工程研究室主任。从事医疗、教学、科研46年。曾先后在加拿大卡尔加里大学医学院和美国罗切斯特大学医学院做访问学者, 国务院特殊津贴享受者。获澳大利亚拉筹伯大学荣誉博士, 俄罗斯远东科学院院士, 省级教学名师称号。2016年荣获“黑龙江医学发展终身成就奖”。

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曾任中华医学会副会长, 哈尔滨医科大学校长, 黑龙江省卫生厅厅长, 黑龙江省医学科学院院长, 黑龙江省政协教科文卫副主任, 黑龙江省医学会会长。主持国家、省重大和攻关课题研究, 荣获国家教学成果一等奖、二等奖, 获省政府科技进步一等奖、二等奖多项。国家级精品课程(国家网络共享资源)《组织学与胚胎学》负责人。培养硕士研究生35名, 博士研究生31名, 博士后28人。发表论文200多篇, 其中SCI收录50余篇。主编《神经生物学》《人体组织与胚胎学》《人体断面解剖图谱》等论著10余部, 主编、参编教材20余部。



序 言

人类胚胎学是生命科学和医学的重要领域之一,是基础医学的一个重要组成部分。通过对人类胚胎发育全过程的学习和研究,会发现许多人类疾病源自于胚胎发育时期。所以对人类先天疾病和各种畸形,胚胎学这一基础理论在临床实践中具有特殊重要意义。众多学者都有一共识:“基础理论如不和临床实践相结合,那这一理论不会得以发展;反之,临床实践如脱离基础理论的指导,其实践也不会得以进步。”

哈尔滨医科大学组织学与胚胎学教研室博士生导师刘慧雯教授用中英文撰写的《人类胚胎学图谱》一书,对其基础理论和临床特征作了详尽新颖的描述,集我国胚胎教学第一线著名专家学者之所长,系统详尽参考了大量国内外相关文献和资料,大胆地以连贯动作画面出现的“图谱”形式展现这一学科的基础理论,实在难得。

常言道:“百闻不如一见,百言不如一图。”用“一目了然”来概括该书的特点可不为过。图谱中大量原创的高水准的数字绘画栩栩如生而又连贯呼应,让读者眼前为之一亮,画面清晰准确地描述了人类各器官系统在胚胎的不同阶段发育的全过程,尤其在人类先天疾病和畸形方面作了经典详尽的介绍。在知识的连贯性和知识的延伸方面给了读者广阔的空间。本著作为一部胚胎学基础理论与临床实践相结合的典范,值得该专业同仁学习参考,也是广大医学生、临床医生和留学生可以选读的一部医学佳作。

愿本书的出版能为我国医学教育事业及临床应用起到促进作用。

中国工程院医药卫生学部主任、哈尔滨医科大学校长

中国工程院院士






Preface

Human embryology is an important areas of life sciences and medicine. Research on human embryos reveals a number of diseases and abnormal development that occur due to malformations during embryo formation and growth. Those characterized by structural deformities are often described as congenital defects or birth defects. Therefore in respect to congenital defects and deformation, the basic theory of embryology plays an especially important role in clinical practice. Many scholars agree upon that: “If basic theory is not connected with clinical practice, the theory will not develop any further; on the other hand, without the guidance of the basic theory, clinical practice will not make much progress either.”

Dr. Liu Huiwen is the author of *Atlas of Human Embryology*. This atlas was prepared by Dr. Liu during her tenure as Professor in the Department of Histology and Embryology at HarbinMedical University. The *Atlas of Human Embryology* is written both in Chinese and English. Dr. Liu has extensive teaching and profound hands-on research experience in embryology. With numerous systematic literature reviews, research manuscripts, and artistic honors, Dr. Liu is accomplished both as an embryologist and an artist. Her talented interpretation of biological structure, embryo development, and its artistic rendering greatly facilitate the learning and comprehension of embryology.

A Chinese ancient once said: “Hearing a hundred times is not as good as seeing once, one picture is worth more than ten thousand words.” This atlas can be described as “simple and profound.” However, “simple” does not mean “less”. It can be explained as “just enough.” Dr. Liu’s vision for this atlas is to introduce its readers to human embryology and allow instant mapping of embryo development with a desired outcome. The goal is to help readers prioritize and be confident about their decision making process by providing comprehension and completely mastery of human embryo development. The photomicrographs found in this atlas come from the collection of the original digital paintings. It is not only a clear and accurate description of the entire processes of human embryo development, it also reveals in vivid visual form the precise contour of the individual



embryonic organs throughout all developmental stages. Through the combination of creativity and technology, this atlas presents you with an eye-opening picture vividly recreating life in color. More importantly, this atlas emphasizes and details human congenital disease, deformities and possible etiology of abnormalities within the developmental process. Dr. Liu's atlas is a true example of how application and modeling of basic theory can be converted into clinical practice. Since clinical treatment will provide the "performance space" for basic embryology theory, this atlas will obtain appreciation from medical students, graduate students, clinicians.

I wish the publication of this atlas will play significantly promote role on China's medical education and clinical application.

**Dr. YangBaofeng, Academician,
Division Head of Medicine & Health
Academician Member of the Chinese Academy of Engineering
Chancellor, HarbinMedicalUniversity**



前言

编写这本图谱动念于1998年。作者当时在参加教育部国家九五攻关课题——组织学与胚胎学CAI课件制作的子项目时,深感国内胚胎学彩色图谱匮乏。在人体胚胎学的教学实践中,一部以连续“动态”图谱形式呈现胚胎学内容,并能通过大量连续画面呈现胚胎发生的原理、解释临床常见先天性畸形的图谱是当前教学及学术研究急需的。2005年,在资深画家、多媒体专家张向光老师帮助下,启动了编写计划。查阅资料、讲解、录像、绘制、反复修改,历时十余年磨合,终于成稿。


该图谱以数字绘画为主体,特别采用全彩色图和三维图描绘胚胎发育的形态特征。另外,这些图大都以动画形式连续图解,用中英文双语标注。书中以胚胎发育过程中的形态发生为主线,重点解析了人体出生前正常发育和异常发育中的所有重要事件和过程,系统地显示器官的正常和异常发生发育的时间、空间演变的关系,用650多幅图片以及注释进行介绍,希望读者通过它能全面、系统、生动地了解人体胚胎发育的复杂过程以及各个器官系统先天畸形的成因。

本图谱对人体解剖与组织胚胎学、发育生物学、再生医学、病理学、生理学、药理学、遗传学等基础学科教师的教学工作,以及中外医学生的学习过程都有很好的参考意义。

作者不仅期望本书能为教师和学生的教与学提供良好帮助,还期望各专业的临床医师通过它能更好地理解自己学科所涉及的各个器官系统的发育过程,知其然且知其所以然地处理相关疾病防治,为患者更好地服务。我们也期望它能成为大众读者喜爱的科普读物,让这部美丽的图谱不仅因其审美价值,更因其内在的知识内容为读者所欣赏。

本书问世后,将陆续随书附赠包含动画的数字资源,每套动画配一段文字,以讲故事的方式呈现。还将生成包括视频等多媒体内容的网络资源,拓展应用空间,使其成为一部“能动作、会说话”的图谱。

这也是一部向老师致敬的作品。借此书,感谢已故硕士生导师李学均教授带作者走进胚胎发育的世界,感谢作者的博士生导师金连弘教授作为该书主审;感谢张向光老师和张海峰老师精湛的绘画功力和敬业精神,协助完成这一美丽的生命孕育过程;感谢杨宝峰院士亲自作序,感谢赵光教授的监制和帮助;感谢中国解剖学会组织胚胎学专业委员会的支持,感谢人民卫生出版社的鼎力帮助;感谢国家科学技术学术著作出版基金和国家自然科学基金(31271287)资助出版;感谢孟励和夏平教授……感谢大家帮助完成这一梦想。



十年,在这个讲求高效率的时代,漫长的时间说明了创作中的困难。痛并快乐地感受着生命的顽强、执着和美丽,它被完成了,今天奉献给大家。

由于编者水平有限,书中难免有疏漏与错误之处,还恳请读者批评指正。

刘慧雯

2017年1月



Preface


In 1998, we came up with the idea of writing *Alta of Embryogenesis*. During that time, there was no reference book with pictures in this medical field and we had an opportunity of participating in a workshop called “9.5. Targeting Sub-Topic Histology and Embryology CAI Courseware”, organized by the National Department of Education. We realized that there was a lack of color pictures for the studies of embryology throughout the nation, so we decided to work on a series of “moving” pictures of embryology and embryogenesis. In addition, we felt that it would also be helpful in understanding the development of clinical genetic diseases.

In 2005, with the help of senior artist and media expert, Mr. Zhang Xiangguang, we started our mission to write, research all literatures, lectures, records reviewing and picture drawing. After many revisions which took a span of 10 years, the first draft was finally completed.

This book focuses on pictures presented via numbers, especially showing the full color pictures and three-dimensional diagrams of embryogenesis. In addition, all the pictures are presented as series of moving pictures with descriptions in Chinese and English. This book will take the reader on a journey from inception of the embryogenesis study to the finality of our presentation, emphasizing the normal and abnormal key events before the birth. Over 650 pictures with description allow the reader to systematically observe normal and abnormal developmental stages and the relationships of each and every internal organ. The complexity of developmental abnormalities will help readers understand the cause of genetic diseases.

This book - *Alta of Embryogenesis*, will be beneficial to the teachers, students and clinicians in understanding human anatomy, histology, embryology, developmental biology, regenes medicine, pathology, physiology, pharmacology and genesis. The foreign students could also use the book as a medical study reference.

The authors envision that clinicians can take advantage of the information from this book in making the



proper treatment plans and administering correct preventive medicine. We hope this book can also be appreciated by all people in many different fields of study.

After publishing this book, we will facilitate future editions with motion pictures with the numbers, possibly multimedia websites et al. Eventually this book will become a book that can “move and talk”.

I deeply appreciate all my supervisors, the late Professor Li Xuejun, who led me to walk inside the embryonic world; Professor Jin Lianhong who was my Ph. D. supervisor and also the key reviewer for this book. I am grateful to Mr. Zhang Xiangguang, Mr. Zhang Haifeng for their spectacular drawings and dedication. I sincerely thank our university president, Professor Yang Baofeng, for writing the preface for this book. My thanks also go to Mr. Zhao Guang for his supervision and assistance. I also want to thank the support of the Histology and Embryology branch of CSAS, full help of the People's Health Publisher and supported by the National Fund for Academic Publication in Science and Technology and NSFC (31271287), and Dr. Li Meng and Dr. Ping Xia for finalizing this book which has brought our dream to reality.

Although it is a world of modern technology now, it still took ten years to complete which indicates the uneasy process during the preparation of this Alta. It is our great pleasure to contribute this beautiful work to this world.

Due to the limited level, the mistakes would be inevitable. We welcome criticism to make the future revisions.

人类胚胎学图谱

ATLAS OF
HUMAN EMBRYOLOGY

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CHAPTER 1

第一章

人类胚胎学总论

GENERAL HUMAN EMBRYOLOGY

