Chapter 3

Physiological Aspects of Female Sexual Development
Conception through Puberty

Cori Baill and John Money

Introduction

Although current knowledge of the physiological aspects of female sexual development from conception through puberty is elaborate and complex, it is not complete. The separation of fact from theory is often difficult, but throughout this chapter, every attempt is made to distinguish what is theory from what is fact. Limitations of technology are in part responsible for the uncertainties of today’s knowledge. So also are social, cultural, and religious taboos, which hamper full scientific inquiry concerning sexuality.

Conception

The hormones that govern the fertility cycle of women increase and decrease cyclically, taking approximately one month to complete a full turn. Conception can take place during about three days of this cycle. At that time, the uterine lining is mature, the cervical-vaginal mucus is thin enough to allow migration of the sperm, and a viable ovum (egg) has been released from the ovary into the Fallopian tube. The sperm of the male and the ovum of the female each contribute 23 chromosomes that will unite to form 23 pairs. The sperm meets the

Cori Baill, B.S., R.N. • Phipps Psychiatric Clinic, The Johns Hopkins Hospital, Baltimore, Maryland. John Money, Ph.D. • Professor of Medical Psychology and Behavioral Sciences and Associate Professor of Pediatrics, The Johns Hopkins University and Hospital, Baltimore, Maryland.

ovum in the Fallopian tube, and they unite. The chromosomes match up in pairs, and a single zygote cell with a full 46 chromosomes is formed. This cell divides and multiplies. By the third day, the zygote implants itself in the mature uterine lining. Programmed by the genetic information coded in the chromosomes, in nine months the zygote cell will have differentiated into all the complex and varied components of the newborn infant.

Phyletically shared attributes of human beings are carried in the chromosomes. All human beings of normal genetic makeup and development have a thumb opposing their fingers, 10 toes, 1 stomach, and so forth. Variations may be genetically coded. Eye, hair, and skin colors are examples. When the human ovum and sperm unite, a unique being is produced from a vast range of possibilities transmitted from the genotypes of the two parents.

Chromosomes are composed of an as-yet-undetermined large number of genes, which themselves are composed of nucleic acids in strands twisted into a double helix. With the exception of the germ cells destined for possible future fertilizations, each cell in the body carries the entire genetic code of 46 chromosomes in 23 pairs, established at the time the ovum and sperm met. The uniqueness of the genetic information contained in each ovum is derived in the following manner: at birth, there are approximately 200,000–500,000 primitive ova (primary oocytes) present in the two ovaries, approximately 400 of which are released during the reproductive years. Two divisions of the oocyte take place to produce a mature ovum containing 23 chromosomes. The first division begins before the woman is born and remains uncompleted until shortly before each occasion of ovulation after she has become an adult. The second division is in progress when ovulation occurs. This division is not completed until after the sperm and ovum meet in the Fallopian tube. There is only one mature ovum created by the two divisions, since after each division a miniature polar body representing one product of the division is expelled.

The processes of sperm and ovum formation are similar, except that during sperm division, no polar bodies are formed. Each division results in two new sperm.

Following conception, the chromosomes are dormant with respect to sexual differentiation until either the 6th or the 12th week of fetal life, depending, respectively, on whether the male partner contributed a Y or an X chromosome. If the father contributed a Y chromosome, at 6 weeks the fetal gonads (left and right) begin to develop as testes. Each Y-bearing sperm and, later, the surface of each Y-bearing cell carry H-Y antigen, which is the stimulus for the gonads to differen-