Rebirthing Traditions: Obstetrics, Pediatrics and Botanical Medicine

Introduction

Women for many millennia have ruled the realm of obstetrics, mostly as herbalist and midwives; a tradition that is slowly returning, now that midwives are becoming legal again. It must be emphasized that women were for the most part the herbalist of the past, especially when it came to reproduction and children’s medicine. In fact the word midwife is derived from the Anglo-Saxon ‘med-wyf’ meaning wise woman. The tradition of the wise woman dates back to the era of the healing priestesses of ancient times. Unfortunately this ended in disaster during the Middle Ages, when many women were burned at the stake for practicing witchcraft. The cycles of time change a lot.

Throughout history building a family is an exciting time for many. The process from conception to first breath can be at the same time scary and confusing. Some people are overwhelmed by the whole process and forget that this is one of the most natural cycles, one that the body already knows how to do. Reproduction for the most part takes care
of itself, with few complications, usually requiring only proper nutrition and strong healthy bodies from the parents. In this lesson we will look at the stages of pregnancy up to and including childbirth. We will conclude with a few common health issues found in infants.

Part One: Fertilization, Pregnancy, and Birth

The cell cycle in sexual reproduction

Unlike mitosis, which occurs throughout the body to replace damaged or otherwise lost cells with genetically identical daughter cells, the cells that are responsible for sexual reproduction develop by meiosis, resulting in genetically different daughter cells. The following are terms and ideas you should be familiar with. If you are not, you should review them from earlier courses or in your text.

Material from this section can be found in your mandatory text: *Principles of Anatomy & Physiology* by Tortora and Grabowski.

Definitions

**Somatic cells**: All body cells of an organism, apart from sperm and eggs cells, the gametocytes from which they arise, and undifferentiated stem cells. Somatic cells are diploid, containing 23 pairs of homologous chromosomes (i.e. the ‘same’) known as autosomes; and 1 pair of sex chromosomes, designated X and Y.

**Meiosis**: cell division of reproductive cells, resulting in two daughter cells (gametes) with half (haploid) the usual number of chromosomes. A gamete is a sperm or egg cell.

**Aneuploidy**: when one or a few chromosomes have above or below the normal chromosome number, e.g. trisomy 21 (Down’s syndrome),¹ Turner’s syndrome² and Klinefelter's syndrome.³

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¹ A condition in which one gamete cell, usually the egg, has two 21st chromosomes instead of one, resulting in a fertilized egg that has three 21st chromosomes.
Polyploidy: more than two haploid (n) sets of chromosomes; in humans such genetic errors are both rare and lethal, and the offspring are miscarried early in pregnancy. Polyploidy is also rare in animals and fungi but very common in plants, although some animals including salmon and salamanders display polyploidy.

Meiosis I consist of five basic stages: prophase I, metaphase I, anaphase I, telophase I and cytokinesis.

Meiosis II, the two genetically different haploid daughter cells essentially go through the same activities as mitosis, called prophase II, metaphase II, anaphase II, telophase II and cytokinesis. The net result is four genetically different daughter cells, each different from the parent cell that originally underwent meiosis I.

Fertilization, pregnancy and embryonic development

Fertilization is the process by which the genetic material of the haploid sperm cell merges with the haploid secondary oocyte to form a diploid cell that will subsequently divide and grow into a fetus. Of the 200 million odd sperm that are in the ejaculate only 1% reaches the cervix. Of these about 200 or so swim up through the uterus into the fallopian tube where the ovum is acted upon by a swarm of sperm cells that gather around it. First the sperm must penetrate through the corona radiata, a collection of granulosa cells that surround the secondary oocyte. Once this barrier has been breached the next barrier to the secondary oocyte is a clear glycoprotein layer called the zona pellucida that has receptors for sperm cells. Once bound to the receptor, the acrosome releases digestive enzymes to create a passage through the plasma membrane of the secondary oocyte, propelled by the flagella of the sperm cell. The first sperm cell that does this is the one that fuses with the secondary oocyte, called syngamy, causing the cell membrane of the oocyte to depolarize and the zona pellucida to harden and thereby prevent the entry of

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2 A congenital abnormality of the female wherein she receives only one X chromosome (XO) instead of the usually complement of one pair (XX), resulting in sterility.

3 Klinefelter's syndrome is a congenital abnormality of the male wherein he receives an extra X chromosome (XXY) instead of the normal XY pair, resulting in sterility.
additional sperm cells into the oocyte. The secondary oocyte then undergoes the last stage of meiosis II, dividing into a larger ovum and a smaller secondary polar body, discarding one chromatid from each chromosome, and then disintegrates. The sperm and mature ovum then swell to become protonuclei, and a mitotic spindle forms between them, rupturing each protonucleus, allowing the chromosomes of the two gametes to form a single diploid set, called a zygote. Fraternal twins are dizygotic, produced from the independent release of two secondary oocytes and the fertilization by two different sperm. In contrast, “identical twins” are monozygotic, arising from the separation of the developing cells into two genetically identical zygotes. Although monozygotic twins share the same DNA, the expression of the genes under the influence of environmental factors (e.g. oxygen supply in utero, mutations, etc.) may result in a different phenotype, and thus most “identical twins” are not identical in every respect (e.g. fingerprints, iris), although many features will appear quite similar.

First week of pregnancy

After fertilization the zygote undergoes a series of rapid mitotic cell divisions called cleavage, beginning within the first 24 hours after fertilization, each cell within it called a blastomere. This process continues so that by the third day after fertilization the original zygote has now divided into sixteen smaller blastomeres, and is now called a morula. At this point the morula is still surrounded by the zona pellucida. As the morula divides it travels down the fallopian tube to enter into the uterus by about day four or five. A nutrient-rich solution secreted by the developing endometrium called uterine milk nourishes the developing morula, and by the time the morula has divided into 32 cells the fluid enters into the morula and reorganizes it so that there is a fluid-filled blastocystic cavity within it. The further development of the blastomeres results in two distinct structures: the inner cell mass and the trophoblast. The inner cell mass is located internally and eventually forms the embryo; whereas the trophoblast is the layer of cells that surrounds the inner cell mass and blastocystic cavity, and eventually goes on to form the placenta. At this point zona pellucida disintegrates allowing the developing blastocyst to adhere and implant into the wall of the
endometrium. The trophoblast secretes enzymes that cause a local thickening of the endometrium around the blastocyst and a hormone called human chorionic gonadotropin that stimulates the corpus luteum to produce estrogen and progesterone, the latter of which inhibits menstruation. By about day eight the regions of the trophoblast that lie next to the endometrium differentiate into two distinct regions: an outer syncytiotrophoblast and an inner cytotrophoblast. During implantation the outer syncytiotrophoblast secretes enzymes to assist in this process, embedding the blastocyst through the endometrium right into the myometrial wall.

Second week of pregnancy

Eight days after fertilization, as the trophoblast develops, the inner cell mass differentiates into two layers called the hypoblast and epiblast. The hypoblast is a layer of columnar cells whereas the epiblast is comprised of two layers of cuboidal cells. Together these cells form a disc-like structure called the bilaminar embryonic disc. As this tissue develops a small opening appears in the epiblast adjacent to the cytotrophoblast that enlarges to form the amniotic cavity. As the amniotic cavity becomes larger a thin membrane of cells forms the amnion, creating the ‘roof’ of the amniotic cavity, whereas the epiblast forms the ‘floor.’ As the fetus grows the amnion eventually surrounds the entire embryo, secreting a filtrate of the maternal blood called the amniotic fluid.

Another event that occurs about eight days after fertilization is the development of the yolk sac. Cells at the edge of the hypoblast migrate and cover the inner surface of the blastocyst wall, forming a thin membrane called the exocoelomic membrane. On the next day, the exocoelomic membrane forms the wall of the yolk sac, formerly the blastocyst cavity. The yolk sac is relatively small and gradually decreases in size proportional to the other tissues that are growing. It functions to store and transfer nutrients to the embryo during the first few weeks of pregnancy while the
uteroplacental circulation is established. The yolk sac also supplies blood cells during the third to sixth weeks, transfers germ cells to the developing fetus that will eventually form the gametes in females, and forms a portion of the gastrointestinal tract.

On the ninth day after fertilization the blastocyst is completely imbedded into the endometrium and the syncytiotrophoblast develops small lacunae within it that eventually coalesce to form larger lacunar networks. As the syncytiotrophoblast secretes enzymes that essentially dissolve the endometrium, it also dissolves endometrial capillaries, allowing blood and secretions from the endometrial tissues to flow into the lacunar networks. This blood supply forms an important source of nutrients for embryonic development.

By the twelfth day after fertilization the extraembryonic mesoderm develops, derived from the yolk sac and forming a connective tissue around the amnion and yolk sac. Cavities gradually begin to appear in the extraembryonic mesoderm, eventually forming a single, larger cavity called the extraembryonic coelom. The extraembryonic mesoderm and the two layers of the trophoblast form the chorion, which surrounds the embryo and later the fetus, forming the embryonic portion of the placenta. The chorion functions to protect the developing fetus from the mother’s immune system and secretes human chorionic gonadotropin (hCG), which prevents degeneration of the corpus luteum. The inner layer of the chorion fuses with the amnion, and the extraembryonic coelom now becomes the chorionic cavity. By the end of the second week the bilaminar embryonic disc is connected to the trophoblast by a band of extraembryonic mesoderm called the connecting stalk, which later becomes the umbilical cord.

By the end of the second week the chorionic villi begin to develop, formed from a projection of the cytotrophoblast. The chorionic villi grow towards the maternal lacunar networks, from which oxygen and nutrients diffuse into the chorionic villi, and into which wastes flow from the chorionic villi. Blood vessels in the chorionic villi connect to the developing umbilical cord, which connects to the
developing embryonic heart. As the chorion develops it matures into the **placenta** by about week twelve.

**Third week of pregnancy**

About fifteen days after fertilization, the bilaminar embryonic disc, consisting of the epiblast and hypoblast, develops into three layers of tissue in a process called **gastrulation**. The differentiation of these tissues can first be seen as the **primitive streak**, a faint groove on the surface of the anterior portion of the epiblast, forming the head and tail of the developing embryo. At the head of the primitive streak forms a small group of epiblast cells that form a structure called the **primitive node**.

The primitive streak undergoes development to form the three primary germ layers, called the endoderm, mesoderm and ectoderm. The **endoderm** forms when cells of the epiblast move below the primitive streak, displacing the hypoblast. The cells that reside between the epiblast and endoderm become the mesoderm. The remaining cells that form the epiblast become the ectoderm. As these tissues develop further, they go on to form the specific tissues and organs. The endoderm forms the epithelial lining of the GI, genitourinary, and respiratory tracts, as well as the epithelium of glands including the thyroid, pancreas, thymus, and prostate. The ectoderm forms the nervous tissue and special sense organs, epidermis of the skin, and epithelium of tissues including the oral cavity, pineal, pituitary and adrenal medullae glands. The mesoderm forms all other connective tissues, including bones, cartilage, muscle, blood, lymphatic tissues, dermis, the middle ear, and epithelium of the kidneys, ureters, adrenal cortex, gonads and genital ducts.

About sixteen days after fertilization the mesodermal cells migrate to the head of the primitive node and form the **notochord**, which plays a role in inducing adjacent, undifferentiated tissues into becoming differentiated, specialized tissues. On the dorsal surface of the embryo two faint depressions also begin to appear: one near the head called the **oropharangeal membrane** (which later degenerates to form the oral cavity, pharynx and GIT), and
one closer to the tail called the **cloacal membrane** (forming the anus, urinary and reproductive tracts). When the cloacal membrane appears, the wall of the yolk sac forms a small vascularized outpouching called the **allantois**, participating in blood cell and blood vessel development and the development of the urinary bladder.

By about the end of the second week angiogenesis occurs in the extraembryonic mesoderm when mesodermal cells differentiate into **angioblasts**, and form a network of blood vessels throughout the embryo. Actual blood cell development however only begins by the end of the third week, first in the extraembryonic tissues including the yolk sac, allantois and chorion, which is then followed in the fifth week within the embryo by the developing liver, spleen, marrow and thymus. The heart also begins to form in the third week from mesodermal cells in response to the notochord, forming a primitive **heart tube**. Eventually the heart tube folds upon itself and begins to beat, and is connected to the network of blood vessels that connects to the umbilical cord, chorion and yolk sac to form a primitive cardiovascular system.

### Fourth through eighth week of pregnancy

As the notochord develops it promotes ectodermal cells to differentiate into the **neural tube**, which develops into the brain and spinal cord in a process called **neurulation**. By about four weeks after fertilization the neural tube enlarges into the three primary brain structures called the **prosencephalon**, **mescencephalon** and **rhombencephalon**. During this time the embryo nearly triples its size, and forms several distinctive features that later give rise to specific tissues and organs, including a primitive digestive tract, the otic and optic placodes (primitive ears and eyes), and upper and lower limb buds. The process of development from what might look like an insect grub in the third and fourth week to something that more closely resembles a human occurs by the end of the eighth week and is quite remarkable. The head grows larger, with the primary brain structures evolving into secondary structures: the prosencephalon differentiating into the **telencephalon** and **diencephalon**, and the rhombencephalon differentiating into the **metencephalon** and **myelencephalon**. The regions of the neural tube
closest to the myelencephalon become the spinal cord. As the embryo develops into a fetus, each of these secondary brain structures form the recognizable portions of a fully developed human brain:

- the telencephalon develops into the cerebral hemispheres, including the basal ganglia, and houses the lateral ventricles
- the diencephalon develops into the epithalamus, thalamus, subthalamus, hypothalamus, and houses the third ventricle
- the mescencephalon develops into the midbrain, which surrounds the cerebral aqueduct
- the metencephalon develops into the pons and cerebellum, and houses a part of the fourth ventricle
- the myelencephalon develops into the medulla oblongata and houses the remainder of the fourth ventricle

By the end of the sixth week the limbs show substantial development, the trunk and neck begin to straighten and the heart develops four chambers. By the seventh week the digits begin to appear. By the start of the eighth week the hands remain webbed and the tail is still visible, but is now quite short. At the end of the eighth week the digits are no longer webbed, the eyelids form and fuse together, the tail disappears and the genitalia begin to differentiate.

The placenta

The process of placental development is called placentation, and results in a placenta, a unique organ that develops from both the embryonic chorionic villi and the maternal decidua basalis of the endometrium. The process of placentation occurs by about the twelfth week, and allows for nutrients and oxygen to diffuse from the maternal blood to the fetus, while carbon dioxide and wastes diffuse from the fetus to the mother. The placenta also serves as a storage organ, containing nutrients such as calcium, iron, carbohydrates and proteins, and protects the fetus from pathogens in the maternal blood. Some pathogens however, such as certain viruses (e.g. HIV, varicella-zoster, and poliovirus) can pass through the placenta and cause disease. The placenta is also permeable.
to drugs and alcohol, which can interfere with normal fetal development.

The connection between the placenta and the embryo is the **umbilical cord**, which develops from the connecting stalk. It consists of two umbilical arteries that carry deoxygenated fetal blood to the placenta, one placental vein that carries oxygenated blood to the fetus, supported by a connective tissue called **Wharton’s jelly** that is derived from the allantois.

### Fetal development

The period after the initial eight weeks after fertilization is called the **fetal period**, which is marked by a distinctly human form that continues to develop into what will become a newborn baby, or **neonate**. Between the ninth and twelfth weeks the head constitutes about half the total body length, the bones form, the heart beat can be detected, the gender can be identified by ultrasound, and the fetus begins to move. Between the thirteenth to sixteenth weeks the rest of the body begins to catch up in size and the head looks smaller in proportion, and the fetus weighs about 100 g, and is about 18 cm long. Between the seventeenth and twentieth weeks the eyebrows and head hair are visible with ultrasound, and the trunk growth slows in proportion to limb growth. The fetal body is also covered in the **vernix caseosa**, a combination of sebaceous secretions and dead epithelial cells, and **lanugo**, delicate fetal hairs. At this point the mother can usually feel the baby’s movements, and the baby weighs between 200-450 g, and is up to 30 cm long. Between the twenty-first and twenty-fifth week the fetus increases in weight, up to 800 g, and measures up to 35 cm in length. The skin is wrinkled and pink, and type II alveolar cells in the lungs begin to produce surfactant. Between the twenty-sixth and twenty-ninth weeks the head and body become more proportional, the eyes are open, and toenails are visible. Body fat begins to accumulate, smoothing out the skin, and the weight is between 1-1.35 kg, the length between 32-34 cm. In males, the testes begin to descend. The red marrow takes over the bulk of RBC production, and if born prematurely, many fetuses can survive with intensive care because the nervous and
respiratory systems have been sufficiently developed. Between the thirtieth and thirty-fourth weeks the fetus weighs between 2 and 2.3 kg, and up to 8% of this is body fat, and the length is between 41 and 45 cm. The skin is pink and smooth, and the fetus usually assumes an upside-down position. Between thirty-five and thirty-eight weeks the circumference of the fetal abdomen exceeds that of the head, the weight is between 3.2 and 3.5 kg, the total body fat about 16%, and the length is up to 50 cm. The skin begins to take on a bluish-pink hue, and in males, the testes have usually descended.

**Maternal changes during pregnancy**

During the first three to four months of pregnancy the corpus luteum secretes small amounts of progesterone and estrogens that maintain the lining of the endometrium and prevent menstruation. The corpus luteum maintains this activity through the stimulus of hCG released by the chorion. hCG levels are detectable in the blood and urine of pregnant women, and usually reaches its peak by about the ninth week. Most OTC pregnancy kits measure this specific hormone in the urine to indicate fertilization. By about the fourth month the placenta takes over secretion of progesterone and the estrogens, in higher amounts than secreted by the corpus luteum, progesterone in particular, which ensures the myometrium is relaxed and the cervix tightly closed. Another hormone called relaxin is secreted by the corpus luteum and later the placenta, which acts to increase the flexibility of the pubic symphysis and ligaments of the sacroiliac and sacrococcygeal joints, and during labor, dilates the cervix. The placenta also secretes human chorionic somatomammotropin (hCS), reaching its maximum levels by about the thirty-second week and plateauing until birth, helping to prepare the mammary glands for lactation, increasing maternal protein synthesis, and shunting metabolic activities towards the consumption of fatty acids instead of glucose, thus making more glucose available for the fetus. The last hormone released by the placenta, and the one most recently identified, is corticotropin releasing hormone (CRH), which is also secreted by the hypothalamus to stimulate adrenocortical functions. In pregnancy however, CRH is believed to
function as a timing mechanism, secreted in progressively larger amounts from the twelfth week of pregnancy to the initiation of labor. Higher levels than normal in pre-full term pregnant women are thought to play a role in premature labor. CRH also plays a role in cortical secretion, which in the fetus, plays a role in the maturation of the lungs.

By the end of the third month of pregnancy the uterus occupies most of the volume of the pelvic cavity, and as pregnancy progresses, extends higher and higher into the abdominal cavity. When the woman reaches full term, the uterus occupies almost the entire abdominopelvic cavity, and as a result, places pressure on all the other thoracic organs. Pressure upon the stomach, liver and gall bladder, ureters and bowels are all common symptoms experienced in late pregnancy, responsible for symptoms including gastric reflux, poor fat digestion, urinary frequency and constipation. There is usually a generalized weight gain from the storage of proteins and fats, and peripheral water retention, the latter of which is often caused by the compression of the inferior vena cava, which can also promote varicose veins. Compression of the renal veins can promote increases in blood pressure. There is a general engorgement of many tissues due to an increase in estrogen secretion, including the mucus membranes, causing nasal stuffiness, difficulty swallowing, and a swelling of the vulva and vagina. Cardiac function increases, with an increase in heart rate and blood volume. Pulmonary function also increases to meet the oxygen demands of the fetus, increasing the rate of respiration. Skin changes are also common in pregnancy, including increased pigmentation around the cheeks and eyes (chloasma), the areolae, and the lower abdomen (linea nigra). In many women stretch marks are also found, but these may more be factor of too great an increase in weight during pregnancy.

**Labor and delivery**

Labor or parturition is the process by which the fetus is expelled from the uterus through the vagina. The onset of labor is guided by a complex mechanism of hormonal
secretions. The high level of progesterone secreted by the placenta during pregnancy prevents labor. During the end of gestation the placenta secretes increasing amounts of CRH, which in turn, stimulates the fetal anterior pituitary gland to secrete ACTH. ACTH acts upon the fetal adrenal glands to secrete cortisol and DHEA into the fetal bloodstream, which makes its way to the placenta. At this point the placenta then converts DHEA into estrogen, and these increasing amounts of estrogen cause the uterine muscle fibers to express proteins that build receptors for oxytocin, and form gap junction between each cell to upregulate cell-to-cell communication. Oxytocin released by the maternal posterior pituitary gland then stimulates uterine contractions, and relaxin secreted by the placenta promotes the dilation of the uterus and relaxation of the pelvic girdle. The estrogens also stimulate the placenta to release prostaglandins which induce the production of enzymes that digest collagen fibers in the cervix, causing it to soften.

The control of labor contraction is one of the few examples of a positive feedback cycle. The contractions of the uterine muscle that forces the baby’s head into the cervix promotes the stimulation of stretch receptors that send impulses back to the hypothalamus, promoting an increase in the secretion of oxytocin. As the baby’s head progresses further into the cervix, more and more oxytocin is released until the fetus is expelled.

Labor usually begins with the rupture of the amniotic sac, followed by periodic waves of myometrial contraction. In some cases the amniotic sac doesn’t rupture and needs to be ruptured intentionally. In the latter stages of pregnancy women often experience periodic contractions called Braxton-Hicks contractions, which occur at irregular intervals, and can be mistaken for labor. True labor begins with the regular contractions of the uterus, as well as discharge of the mucus plug that blocked the opening of the cervix (i.e. the “show”). The first stage of labor and the longest and most trying, is dilation, in which the cervix progresses from its contracted state to its fully dilated state of about 10 cm. The progress of the labor is usually staged according to the degree of dilation. Following complete dilation is expulsion, in which the baby is expelled from the uterus and is delivered. After expulsion is the placental stage in which the placenta is delivered by powerful uterine
contractions (assisted by the suckling infant), to expel the placenta and contract the uterus to prevent excessive blood loss.

The process of birth is indeed painful for the woman, and apart from the risk of hemorrhage, is life-threatening for the baby. Vaginal birth causes a compression of the cerebral arteries causing hypoxia, initiating the secretion of epinephrine and norepinephrine from the adrenal medullae, which helps to clear the lungs of mucus, utilize stored nutrients for energy production, and enhance cerebral and cardiac circulation. The rising CO\textsubscript{2} levels caused by vaginal delivery stimulate the respiratory center in the medulla oblongata, causing the baby to take a very deep breath when first born, followed by a vigorous exhalation (often as crying), to expel the CO\textsubscript{2}. A short time after, the hole between the neonatal atria called the **foramen ovale**, which allowed fetal blood oxygenated by the mother to pass directly from the right atrium into the left atrium, and into the left ventricle for circulation, begins to close and becomes the **fossa ovalis**. Thus the blood is now passed into the fetal lungs by the pumping action of the right ventricle. Another development occurring a short time after birth is the closure of the **ductus arteriosus**, a small vessel that connects the fetal pulmonary trunk to the fetal aorta, which closes under the influence of bradykinnin released during the first inflation of the lungs. The last of the major events to occur in the newborn during the post-partum period is the collapse of the ductus venosus and the closure of the umbilical cord. The **ductus venosus** is a connection between the umbilical cord and the inferior vena cava, which allows the fetal blood to bypass the liver. After birth the movement of blood from the umbilicus slows, and is usually cut. This causes the ductus venosus to collapse and the blood arising from the viscera is shunted through the hepatic portal vein. The ductus venosus then becomes ligamentum venosum. During this time the umbilical arteries and vein fill with connective tissue, and become the medial umbilical ligaments and the ligamentum teres of the liver, respectively.

Following delivery, uterine contractions occur throughout the post-partum period in a process called **involution**, in which the uterus gradually returns to its normal shape. Once again, this process is facilitated by the infant
suckling, which stimulates the release of oxytocin. Women also usually experience a continuous discharge called lochia, consisting of blood and serous fluid secreted by the areas of the uterus that once contained the placenta.

**Lactation**

Lactation is the process by which the mammary glands secrete and eject milk from the breasts through the nipples. Milk synthesis and secretion is regulated by the secretion of prolactin, which is induced by the suckling of the newborn, and facilitated by the fall in progesterone levels after birth. Whereas prolactin is responsible for milk synthesis and secretion, oxytocin promotes the ejection of milk (i.e. “let down”). Usually it requires several minutes of sucking to stimulate oxytocin release; other factors can also promote milk let down, including the cries of the baby (or any baby generally), and sexual stimulation.

The first few days of milk secretion consist of a cloudy fluid called colostrum. Although colostrum contains less lactose than normal milk, and almost no fat, it contains vital immunoglobulins that enhance the baby’s immunity and protects against illness. By about the fourth day the milk become progressively “milkier,” with higher fat, protein and sugar content. Colostrum continues to be secreted through the first few months, often during the initial stages of suckling, followed by the richer, more nutritious “hind” milk.

If lactation is frequent enough, between 8-10 times daily, it tends to have a suppressant activity upon ovulation, although this is not consistent, nor is it an effective method of contraception.
Part Two: Pregnancy Preparation and Natural Contraception

Infertility

The term **infertility** refers to the inability of a couple to become pregnant after one year of unprotected sexual intercourse. It is thought that infertility affects between 10-15% of couples of reproductive age. Although the prevalence of infertility has remained more or less stable over the last 50 years, some researchers speculate that the rate of infertility may be increasing, especially in comparison to rates previously experienced in pre-industrialized society. Much of this concern is attributed to exposure from man-made, industrial chemicals that contaminate the environment, including solvents (e.g. benzene), polyhalogenated aromatic hydrocarbons (PHAHs, e.g. benzo[a]pyrene, PCBs, dioxins), herbicides (e.g. 2,4-D) insecticides (e.g. dibromochloropropane), fungicides (e.g. vinclozolin), metals (e.g. lead, cadmium), and plasticizers (e.g. bisphenol-A). Mostly the concern relates to chemicals called **xenoestrogens** that have an estrogen-like activity, but these chemicals can have other effects as well, such as increasing or decreasing the secretion of estrogen and androgens, inhibiting hormonal activities generally, or causing direct damage to reproductive tissues. While various studies have demonstrated the negative effects of these compounds in animals, there is little evidence to suggest what impact they have on humans. One recent study suggests however that the risk of infertility and endometriosis is greater for couples living in heavily contaminated regions compared to couples living in less contaminated areas (Carpenter et al 2001). Taking steps to limit exposure to industrial chemicals appears to convey a protective benefit and enhance fertility, as shown by a study published by the *Lancet* a few years back, in which Danish farmers that ate pesticide-free food had roughly double the average number of sperm than normal (Abell et al 1994). Although there is a significant theoretical risk of infertility associated with exposure to many industrial chemicals, even natural compounds have been implicated. Most notably these
include **phytoestrogens** found in legumes such as soya, as well as in other plants. It has been shown that phytoestrogens can impair fertility in animals (Millan et al 2001; Setchell et al 1987), and when exposed to these compounds continuously from an early age, could promote estrogen dependent diseases in humans later in life such as ER+ breast cancer and endometriosis (Allred et al 2001). Other environmental factors that affect fertility include tobacco and cannabis smoke, stimulants (e.g. coffee, tea, cocaine), and alcohol (in women specifically).

The cause of infertility in couples is often multifactorial, and can be related to defects in the man, woman or both. Most cases of infertility have a specific cause, such as pelvic inflammatory disease and endometriosis in women, or a chronic genitourinary infection in men. Other causes in women specifically include excessive exercise and weight loss.

When a couple is having difficulty becoming pregnant and all identifiable factors have been ruled out the couple is termed a **normal infertile couple (NIC)**. In this case the problem of infertility may be related to factors that are difficult to detect, such as a dysfunction of the oocyte or sperm, or a problem relating to embryonic development or implantation. Medical treatments for infertility typically consist of assisted reproductive technologies including *in vitro* fertilization and implantation, with hormonal stimulation.

**Fertility in Holistic Medicine**

In the same way that plants under stress or growing in less than optimal environments tend not to flower, or produce sterile seeds, fertility also requires an optimal environment to enhance the vitality of the organism, and ensure viable reproduction. These factors include:

- **Diet**: the diet should be comprised of whole food, and organically grown (when possible), free of contaminants and pesticides (e.g. herbicides, insecticides, and fungicides). The diet for both partners should also contain an optimal range of nutrients, with
an avoidance of calorie-rich, low-nutrient “junk foods.” The idea here is to have the majority of the food as whole food. Emotional attachment to and fear of junk food is another type of stress that can affect a person. Some authorities suggest that “fun food” should be less than 10% of diet.

Women wishing to become pregnant may take a prenatal vitamin in addition to other key nutrients such as adequate protein, iron, vitamin B-complex (especially folic acid), vitamin E, magnesium, zinc and omega-3 fatty acids. In men much the same recommendations are made, with an emphasis on key nutrients such as the B-vitamins, omega-3 fatty acids, vitamin E, selenium and zinc.

- **Stimulants, drugs and alcohol:** stimulants, drugs and alcohol should be avoided as they tend to deplete the body of vital energy, which is used to nourish and protect the reproductive tissues. This includes tobacco, coffee, tea, cannabis, cocaine, amphetamines, and opiates. Many physicians that specialize in reproductive technologies also recognize these factors, and sometimes refuse to work with the couples that continue to engage in such behaviors. The most notorious drugs - alcohol, coffee and tobacco - which many people consider innocuous simply because they can be obtained legally, should be avoided.

- **Stress reduction:** it has been established that mental and emotional stress can negatively affect fertility (Sheiner et al 2003; Sheiner et al 2002). In order to best assist with reproductive success the couple should attempt to reduce work, social and relationship stressors, and develop better techniques to deal with them. This could include meditation and relaxation exercises, moderate exercise, and counseling.

### Cleansing and purification

From a traditional perspective, the accumulation of toxins that impair metabolic process and inhibit the production of the vital essence (e.g. jing, ojas) of the body is a common cause of infertility. Thus before any attempt is undertaken to build up the vital essence, the treatment is directed
towards cleansing and purification. In most cases this simply involves the adherence to a quality diet for a period of 2-3 months, and the use of botanicals to up regulate the function of the eliminative organs, e.g. Triphala churnam, 2-3 g tid., or a formula similar to the following, as tinctures:

Cascara Sagrada aged bark *(Rhamnus purshiana)* 15
Black Radish seed *(Raphanus sativus)* 15
Barberry root *(Berberis vulgaris)* 15
Mullein herb *(Verbascum thapsus)* 15
Pipsissewa leaf *(Chimaphila umbellata)* 15
Cleavers leaf *(Galium aparine)* 15
Ginger root *(Zingiber officinalis)* 10

Rx: 5 mL, tid, aq cal ac.

At the very least both partners should do a cleansing program like the twelve day Herbal D-tox to clear out waste materials. For women who are attempting to conceive after using oral contraceptives, an additional therapy is to normalize the menstrual cycle. The use of Femaherb for three months can usually achieve this. Other botanicals such Chasteberry *(Vitex agnus castus)*, False Unicorn root *(Chamaelirium luteum)* and Black Cohosh *(Actaea racemosa)* can be used along with the above strategy. During this period of cleansing the couple should find alternate methods of contraception, including condoms or natural methods (discussed below).

**Virility**

In all traditional cultures children were highly valued, and thus there are a number of natural therapies that can be used to enhance fertility. As the *Ashtanga Hridaya* states:

"Stumbling walk and incomplete speech, bodies covered with dust and dirt, the mouth and face dirty and covered with saliva. In spite of all these things the child is gladdening to the heart: what other thing is equal to its sight and touch?"

*-Uttarasthana*, XL:10-11

In Chinese medicine, treatments that enhance virility are those that enhance and support the proper function of jing, qi, blood, yin and yang, collectively identified as Fu Zheng therapy. In women the choice of agents is directed towards
supporting yin, whereas in men the treatments tend to focus on yang: nonetheless these emphases do not exclude that either treatment be used in supporting reproductive function in the opposite sex, especially when individual signs and symptoms indicate this. The following are examples of herbs that restore qi, blood, yang and yin, all of which help to restore the vital essence, or jing, stored in the Kidneys:

- **Qi restoratives**: Ren Shen (*Panax spp.*), Shan Yao (*Dioscorea opposita*), Huang Jing (*Polygonatum sibiricum*)
- **Blood restoratives**: Shu Di Huang (*Rehmannia glutinosa*), He Shou Wu (*Polygonum multiflorum*), Gou Qi Zi (*Lycium chinense*), Sang Shen (*Morus alba*)
- **Yang restoratives**: Lu Rong (Deer or Elk velvet), Dong Chong Xia Cao (*Cordyceps sinensis*), Yin Yang Huo (*Epimedium grandiflorum*), Bai Ji Tian (*Morinda officinalis*), Bu Gu Zhi (*Psoralea coryfolia*), Du Zhong (*Eucommia ulmoides*)
- **Yin restoratives**: Xi Yang Shen (*Panax quinquefolium*), Tian Men Dong (*Asparagus cochinchinensis*), Shi Hu (*Dendrobium nobile*), Han Lian Cao (*Eclipta prostrata*)

In Ayurvedic medicine virilification is an important branch of treatment called vajikarana rasayana, meaning “to do like a horse.” Once a therapeutic regimen of purification has been implemented, specific remedies are given to enhance the production of ojas. Many of these remedies oppose the basic qualities of vata and increase the qualities of kapha: thus the prior regimen of purification is key to the success of the treatment, to eliminate ama and inhibit its accumulation by enhancing agni. To this end vajikarana treatments are often used along with dipanapachana remedies that strengthen agni. Examples of important vajikarana herbs include Shatavari (*Asparagus racemosus*), Ashwagandha (*Withania somnifera*), Gokshura (*Tribulus terrestris*), Amalaki (*Emblicia officinalis*), Brahmi (*Bacopa monniera*), Musta (*Cyperus rotundus*), Guggulu (*Commiphora mukul*), Arjuna (*Terminalia arjuna*), Tila (*Sesamum indicum*), Yashtimadhu (*Glycyrrhiza glabra*), Bala (*Sida spp.*), Kapikachhu (*Mucuna pruriens*), Punarnava (*Boerhavia diffusa*), Shuktibhasma (purified oyster shell ash), Shringaputa (deer horn ash), and Shilajit. These
herbs are often used along with dipanapachana herbs that enhance digestion, some of which also have vajikarana-like properties, including Ela (*Elettaria cardamomum*), Pippali (*Piper longum*), Jatiphala (*Myrsitica fragrans*), Tvak (*Cinnamomum cassia*), and Shunthi (*Zingiber officinalis*). Overall, these dipanapachana remedies should account for 10-20% of the total formula ingredients, the remainder comprised of vajikarana remedies, such as the one’s listed above. If the formula is administered as a powder, it should be mixed with a proportion of ghee and fresh honey, or be decocted in milk and taken with jaggery.

Please consult *The Human Flower: Reproductive Health and Botanical Medicine* for a more thorough discussion of factors that affect fertility.

**Natural birth control**

The technological advents of the 20th century have wrought many changes to the social structure of the Western world, many of which are now rippling through developing nations. One of the more significant changes was heralded by the arrival of the “Pill,” (birth control pill; BCP) which in large part was responsible for the “sexual revolution” of the 1960s and 1970s. Freed from the concern that sexual intercourse would inevitably result in a pregnancy, oral contraceptives enabled both women and men to freely explore their sexuality. Of course this liberation was only limited to pregnancy, not infection, and with the increased rates of sexual promiscuity that is a hallmark of modern society, there has been an associated increase in the prevalence of STDs such as *Chlamydia trachomatis*, *Neisseria gonorrhoeae* and HIV. The ubiquitous usage of contraceptives and a decline in the birth rate in developed countries such as Canada has had potentially dramatic repercussions for women’s health, increasing the risk of diseases such as breast cancer that are specifically inhibited by pregnancy and lactation.

Apart from these concerns however, oral contraceptives (OCs), transdermal contraceptives, injectable contraceptives and their surgically implanted counterparts have health risks, specifically a moderate increase in the risk of developing breast, cervical and liver cancer. This
relates to artificially suppressing the endogenous production of female hormones such as estrogen and progesterone with potent animal source or synthetic analogues (e.g. premarin, progestins). These agents act to inhibit the secretion of gonadotropins, which in turn prevents follicular maturation and ovulation and results in endometrial thinning. It appears that the likelihood of developing such diseases from using hormonal contraceptives is related to duration of usage. It is recommended that women look for alternatives to hormonal contraceptives when a woman has been on them for 10 years or more. The long-term use of hormonal contraceptives also has implications for other aspects of the endocrinial system, and some women who have taken hormonal contraceptives may note problems related to thyroid function.

Of course there are many alternatives to hormonal contraceptives, including barrier methods (e.g. condoms, cervical caps, diaphragms), copper intrauterine devices (IUDs), hormonal IUD, as well as surgical options such as tubal ligation (in women) and vasectomy (in men). All of these methods have their benefits and pitfalls, and can be used in place of hormonal contraceptives. These methods however are beyond the scope of this text, which will specifically review natural fertility management techniques.

**Fertility management**

Natural birth control methods such as herbal contraceptives can be used in conjunction with methods that track a woman’s estrus cycle to determine ovulation. Although ovulation typically occurs over a 24-hour period, thus limiting the window for fertilization, sperm can reside in the vaginal and cervical mucosa for up to five days. It is usually considered “active” for up to 48 hours. After this the probability of fertilization decreases dramatically. Thus in a normal 21 to 28 day cycle, at least six days of the cycle represents a potential for conception to occur. Natural fertility methods attempt to identify the ovulatory cycle, and during this time, as well as the few days before, the couple abstains from sexual intercourse, or uses a condom if they don’t want to conceive. If they want to conceive, this is the most appropriate time. Remembering if the male
has too many orgasms, they reduce the number of viable sperm.

There are a variety of methods to determine the ovulatory cycle, from devices such as mini-microscopes in which a woman routinely examines her saliva for a characteristic fern-like pattern that indicates ovulation, to hand-held microcomputers that test for electrolytes in the saliva, urine or vaginal mucus and indicates, tracks and predicts ovulatory cycles. The best of these devices are probably the latter, but can be a significant investment (although compared to the cost of BCPs, these devices pay for themselves within three years). A less expensive method is to use a basal body temperature chart in conjunction with an assessment of the cervical mucus. Ovulation is indicated when the basal body temperature chart indicates an elevation in the body temperature first thing in the morning, and the mucus develops a viscous egg-white consistency. For more information on this method please consult The Human Flower: Reproductive Health and Botanical Medicine.

Part Three: Care of the Mother

Prepartum care

First trimester

Having a baby is an extremely exciting time for a couple, although there are a number of physiological changes in a woman that may be a cause of consternation. Generally speaking, the first three months or first trimester of pregnancy are marked by the initial hormonal changes of pregnancy. The most predominant shift is the hormonal stimulation of mucosal tissues and underlying smooth muscle, which can cause these tissues to become engorged and hypersensitive. Many pregnant women experience symptoms such as increased nasal stuffiness, and especially nausea and vomiting (i.e. morning sickness). The extent to which a woman will experience these symptoms is highly variable: some midwives use the severity of these symptoms to indicate the sex, i.e. nausea and vomiting are
more likely when carrying a female fetus or twins (possibly due to an elevation in estrogen in the former, and hCG in the latter). Some studies have also linked morning sickness to maternal nutrient deficiencies (Kallen 1987). When morning sickness becomes severe, marked by constant nausea and vomiting, there is significant risk of dehydration, electrolyte imbalance and malnutrition, which can impair fetal growth and maternal health.

There are a variety of strategies to combat morning sickness, which as the term suggests, usually occurs in the morning. One strategy is to keep something in the stomach at all times, and many women find that eating smaller, more frequent meals is helpful (especially as the uterus expands into the abdominal cavity and reduces stomach volume). To this extent, it may be helpful for the pregnant women to have a bag of soda crackers or oatcakes beside the bed, and when she wakes up in the morning to eat a few. Spicy and stimulating foods and beverages should be avoided, and many pregnant women find that they cannot tolerate chilies, garlic and coffee. The recommendation to avoid spicy, warming foods is also recommended by Ayurveda, which suggests these foods can actually be harmful. This includes members of the nightshade family (e.g. eggplant, peppers, tomatoes, potatoes, chilies) as well as black pepper, papaya and curd. Of course it is wise to ensure the optimal nutrition of the pregnant mother and avoid refined foods.

For more pronounced morning sickness or hyperemesis gravidarum a number of herbal remedies can be helpful. These include aromatic antispasmodic herbs such as Zingiber root, Pimpinella seed, Foeniculum seed, Coriandrum seed, Carum seed, Anethum seed and Trachyspermum seed. These herbs can be prepared as a decoction or tincture, taken as needed. Both the tincture and the essential oils (EO) can be prepared as a pleasant syrup, using sugar syrup as a base and adding sodium bicarbonate, for example:

Ginger EO 15 gtt.
Dill EO 15 gtt
Fennel EO 10 gtt

4 The volatile oil of Foeniculum seed has estrogenic properties and should be avoided in chronically high doses during pregnancy.
Sugar syrup, 200 mL
Sodium bicarbonate 25 g

Rx: 5 mL (1 tsp), mixed with water, bid-tid

In this formula each dose contains 0.625 g of sodium bicarbonate and 1 gtt of EO (37.5% each Ginger and Dill, 25% Fennel).

Many herbalists feel that consuming Red Raspberry leaf tea (*Rubus idaeus*) throughout the pregnancy is not only helpful for toning the uterus but also to prevent morning sickness.

In hyperemesis gravidarum an electrolyte solution should be taken throughout the day in addition to the strategies mentioned above. The following is a modification of an electrolyte solution suggested by the World Health Organization. As a base to this formula prepare an infusion of *Taraxacum* leaf, *Urtica* leaf, *Avena* straw and/or *Nepeta* leaf because they are all excellent sources of various electrolytes, including potassium:

1 litre infusion of equal parts Nettle, Dandelion, Oatstraw and Catnip, allowed to cool
3.5 g sodium chloride
2.5 g sodium bicarbonate
1.5 g potassium chloride
20 g sugar

Additional strategies for hyperemesis gravidarum include homeopathic Cannabis 30X, Nux Vomica 6X and Ipecac 30X. The proprietary homeopathic Spascupreel is also effective.

During pregnancy (and also before) it is especially important to avoid teratogenic substances, or substances that harm or damage the fetus. There are a number of herbs that should be used only in small amounts or avoided during pregnancy unless they are specifically warranted, including those that have hormonal activities (e.g. *Daucus*, *Panax*, *Withania*, *Glycyrrhiza*), are laxative (e.g. *Rhamnus*, *Rheum*, *Cassia*), are diuretic (e.g. *Barosma*, *Arctostaphylos*, *Petroselinum*), are emmenagogues (e.g. *Galega*, *Gossypium*, *Daucus*, *Tanacetum*), or have pronounced antimicrobial or parasiticidal properties (e.g. *Hydrastis*, *Juglans*, *Azadirachta*). A number of pharmaceutical drugs
and medical interventions should also be avoided including hormonal contraceptives, DES (diethylstilbestrol), aspirin, antihistamines, antibiotics, laxatives, diuretics, stimulants (e.g. ephedrine, amphetamines), vaccines, radiation, amniocentesis, ultrasound, and dental work. Effort should also be made to avoid tobacco and cannabis smoke, alcohol, heavy metals, pesticides, hormones in food (e.g. industrial animal products), solvents, airborne and environmental pollutants, and cat feces (from the risk of toxoplasmosis, which can cause birth defects).

The diet should be particularly rich in nourishing foods, adequate proteins, omega-3 fatty acids and other quality fats, whole grains, vegetables and fruits. There has been some recent concern that a lower carbohydrate diet in pregnant women could promote a folic acid deficiency, which can cause neural tube defects such as spina bifida, as refined cereal products are fortified with folic acid. Folate is the natural form of the synthetic folic acid, and if a woman consumes leafy green vegetables and folate-rich foods such as eggs she will get adequate folate. Nonetheless, it is recommend that all pregnant women regardless of their diet take a good quality prenatal multivitamin that contains a minimum of 1 mg of folic acid, with additional omega-3 fatty acids (equaling 1000 mg of EPA and DHA) on a daily basis. Additional supplements can include vitamin B complex (50 mg/day), vitamin C (1 g/day), vitamin D (1000 IU/day), calcium (800 mg/day), magnesium (600 mg/day), iron (20 mg/day) and zinc (15 mg/day). Many of these minerals can be found in foods such as sea vegetables.

**Supplement to avoid:** Even though EPA and DHA are very important during most of the pregnancy, they can reduce contractions if used heavily in the last month of pregnancy. In some societies that are very heavy fish eaters (Eskimos, Japanese) gestation is often extended, resulting in birth problems. Essential fatty acids should be stopped in the last month of pregnancy. Vitamin C is beneficial during pregnancy, but excessive amounts can cause a vitamin C dependency in the child. It is suggested that the mother not take more than 1.5 grams daily on a regular basis during pregnancy. Short intervals of increasing vitamin C to 3 grams, is not a problem, as long as it is less than a week. Zinc fits into this same idea, small amounts are good, but
more than 50 mg daily during pregnancy makes the child have a higher than normal need for zinc.

**Miscarriage**

Miscarriage is the spontaneous, natural abortion of the fetus, and usually occurs during the first trimester. Although miscarriage is hardly a celebrated event, in actual fact it is most often a way for the body to stop a non-viable pregnancy before it has progressed too far. Thus one school of belief would suggest that miscarriages should not be stopped if it needs to happen, and to create a space for it to occur. Some women however experience repeated miscarriage, and in these cases the problem is not so much with the viability of the fetus, but may be a problem within the mother’s ability to sustain a pregnancy, such as an incompetent os cervix, excessive uterine spasm, or hormonal dysregulation. In such cases treatment for threatened miscarriage is warranted, and should be addressed before the next pregnancy, using hormonal regulators and uterine tonics. When miscarriage is threatened, such as if the uterus is cramping and there is a little spotting, treatment should be swiftly implemented to address these issues, utilizing progesterogenics, uterine tonics and antispasmodics:

- **progesterogenics:** *Vitex, Paeonia, Dioscorea, Asparagus*
- **uterine tonics:** *Nymphaea, Achillea, Chamaelirium, Rubus*
- **uterine antispasmodics:** *Viburnum prunifolium, V. opulus, Lobelia*

Additional therapies to prevent miscarriage include inverted postures (e.g. head stand, shoulder stand, lying on a slanted board head down), bed rest, and strict avoidance of tobacco and alcohol.

When a miscarriage has occurred, herbs that have an anti-hemorrhagic property should be used, such as *Panax notoginseng, Capsella,* and *Achillea,* along with connective tissue trophorestorative nutrients such as vitamins A, C, and E, as well as zinc.
Second trimester

The next period of three months, or the second trimester, is usually the easiest trimester for pregnant women, when the morning sickness has declined or disappeared altogether, and the quickening on the womb begins to make itself known to the mother by the occasional movement. A daily infusion of *Rubus* and *Urtica* leaves, 2-3 cups daily, to add to the nutrient content of the diet and tone the uterus, is recommended. If the pregnancy is threatened by miscarriage we use a similar protocol as what was discussed under the first trimester. During the second trimester the blood volume begins to increase, and as a result, there is a concomitant hemodilution and physiologically lowered hemoglobin (Hb), hematocrit (Hct), and red blood cell (RBC) values, which can result in anemia. In most cases this is of little concern, and it’s only when Hb values are less than 10.5 g/dL that treatment is indicated. A complicating feature of the hemodilution of pregnancy is that the woman often lacks sufficient iron stores. In such cases iron-rich foods should be incorporated into the diet, including red meat, yams, figs, beets, and leafy green vegetables. Useful herbs include *Urtica*, *Rumex*, *Lycium*, *Rehmannia* and *Angelica sinensis*. Helpful supplements include vitamin B complex, vitamin C, and supplemental iron. Many iron supplements prescribed by doctors may cause problems such as constipation, and thus natural products such as Floravit® are preferred for mild to moderate anemia.

Third trimester

The last period of three months, or the third trimester, is an exciting time for the mother and especially those around her, who definitely see indications of fetal growth. It is a period of time however, despite an indication that it will soon end, that is complicated by symptoms that cause increasing difficulty for the pregnant women. Most of these problems relate to the enlarging abdomen that interferes with organ function in the thoracic viscera, and impairs circulation. Thus the most common problems include gastric reflux, difficulty breathing, poor fat digestion, constipation, hemorrhoids, frequent urination, lower back pain, muscle cramps, varicose veins and fatigue. Most of these problems are unavoidable, but with some simple strategies many can be ameliorated:
• **gastric reflux**: small frequent meals, DGL, *Ulmus* powder
• **difficulty breathing**: relaxation, meditation, yoga
• **poor fat digestion**: bitter foods (e.g. endive, dandelion), herbal bitters in small doses before meals, digestive enzymes
• **constipation**: exercise, prune juice, high fiber foods, hemp and flax seeds, probiotics, *Rumex, Taraxacum*
• **hemorrhoids**: treat constipation; cold water sitz baths, demulcents (e.g. *Plantago, Althaea, Aloe*) and astringents (e.g. *Quercus, Hamamelis, Achillea*) applied topically, musk ointment; flavonoids
• **frequent urination**: assess for cystitis and treat if positive, e.g. *Arctostaphylos, Chimaphila*, probiotics
• **lower back pain**: gentle massage, stretching, yoga, proper footwear
• **muscle cramps**: calcium/magnesium (800-1200 mg daily), gentle massage, stretching, yoga
• **varicose veins**: inverted postures, stretching, yoga, flavonoids and flavonoid-rich herbs (e.g. *Crataegus, Vaccinium*); *Aesculus* cream (10-20% v/v) topically; distilled Witch Hazel topically
• **fatigue**: fig syrup, bee pollen, royal jelly, *Avena, Withania, Scutellaria*

For a more detailed analysis please consult the Applied Phytotherapeutics module that deals with each particular condition.

**Labor and delivery**

Unless an herbalist is also a midwife or an obstetrician, it is unlikely that he or she will play a primary role in labor and delivery. Nonetheless, there are a number of remedies that can greatly assist in ensuring a normal, easy and relatively quick delivery.

Most herbalists recommend a parturient formula some time between two – six weeks before the due date. There are a variety of formulas, and most utilize herbs that have emmenagogue properties and have been traditionally used for this purpose. This includes botanicals such as *Actaea*...
(Cimicifuga), Caulophyllum, Mitchella, and Mentha pulegium, dosed in modest amounts, between 2-3 mL, twice daily.

During the time leading up to labor the woman’s membranes may rupture prematurely, increasing the risk of infection. To prevent infection and to delay the medical inducement of labor the woman should practice absolutely meticulous hygiene. Echinacea tincture can be taken as a prophylaxis, 40 drops, three times daily. Another issue leading up to labor is false labor. Please refer to the section under miscarriage and utilize remedies that help to ease uterine spasm.

Sometimes the due date comes and goes. In most cases this is normal, and a woman can still give birth a good two weeks after the due date without any harm to the fetus. When this happens a number of recommendations follow:

- regular exercise, walking
- off-road excursions
- regular sexual activity
- herbal emmenagogues (as a last resort): Mentha pulegium, Galega, Tanacetum vulgare

Once the membranes have ruptured and labor begins, a number of things can go wrong: the labor becomes stalled and the cervix doesn’t relax sufficiently (rigid os). Often this problem relates to the mother being overly anxious, and often a change of scenery is a good idea, or some relaxing music, aromatherapy, etc. Herbs to relax the woman include Scutellaria, Nepeta, Leonorus, and Valeriana. Herbs to relax the cervix specifically include Lobelia and Gelsemium. Oxytocic herbs to enhance uterine contraction include Caulophyllum, Actaea, Viscum and Gossypium. Some midwives may use nipple or clitoral stimulation to enhance the secretion of oxytocin. After birth the woman may bleed excessively, which demands immediate attention. For this purpose, herbs such as Capsella, Achillea, Trillium or Panax notoginseng can be considered, as well as the Chinese patent remedy Yunnan Paiyao (in which the red pill is taken along with two capsules, followed by two more capsules every 20-30 minutes). If the cause of the hemorrhaging is related to the

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**Suggest program for six weeks before delivery**

**Dr. Christopher’s PN-6**

**Equal Parts**

- Squaw vine (*Mitchella*)
- Holy Thistle (*Cnicus*)
- Black Cohosh (*Cimicifuga*)
- Pennyroyal (*Mentha*)
- False Unicorn (*Chamaelirum*)
- Raspberry leaves (*Rubus*)
- Lobelia

As tea: 1 tsp / cup drink bid
As tincture: 30 drops bid
retention of the placenta then the oxytocic herbs can be used with the antihemorrhagic herbs.

Post-partum care

Conception, pregnancy, labor and delivery take an enormous toll on a woman’s health, exacerbated by the infant feeding, which places an additional strain on the mother. As a result post-partum deficiencies are common and under-diagnosed, leading to nutritional problems, weakness and fatigue, and depression. In most cultures the post-partum woman receives a great deal of support with specially medicated herbal rejuvenatives along with nutritious food, at least a week of bed-rest, and regular massages. In some part the post-partum deficiency state relates to instinctual rituals that are no longer practiced by most cultures, such as eating the placenta, as do most mammals including herbivores. The placenta is an organ filled with nutrients such as protein, calcium and iron, and its unceremonious disposal in a hospital incinerator seems to hardly do it justice. In traditional Chinese medicine the placenta is sometimes fed back to the mother, after it has been washed and slowly dehydrated, given to her in a powdered form. In other traditions the placenta is decocted with herbs and given as a broth.

Most women, at least in the West, would probably look rather unkindly upon this idea, and thus a number of strategies can be employed to replace the nutrition and energy of the placenta. This includes incorporating certain meats, organic dairy, leafy green vegetables, and heavy fats such as ghee, olive and coconut oils into the diet. It is recommended that post-partum women be given a nourishing broth like “Energy soup,” that is medicated with medicinal herbs:

**Energy soup**
- 1 lb (500 g) of organic, free range chicken, goat, or lamb, with bone
- 3 large Carrots- 1/4 inch slices
- 2 med Onions- chopped into eighths
- 2 medium Yams- halved and sliced into 1/2 inch slices
- 2 med Zucchini - halved and sliced into 1 inch chunks

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<thead>
<tr>
<th>Suggested Postpartum program</th>
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<tr>
<td>Femaherb 2 tablets bid for six weeks</td>
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<td>Twan Kei Gin tonic 1 tablespoon bid for two bottles</td>
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Ghee or Butler, 3 - 5 tablespoons

Jujube date or prunes, 1/4 cup
Astragalus root slices, 15
Ginseng roots, 1 - 3 small roots, chopped into chunks
Garlic, fresh, medium-sized head, crushed
Ginger root, 2 inch chunk, chopped into slices
Black unhulled sesame seeds- 1 tablespoon
Cardamom pods- 10 pods
Mustard seed - 1/2 teaspoon
Cinnamon, 2 - 3 sticks
Cumin seed- 1 teaspoon
Coriander seed, crushed- 1 teaspoon
Coriander powder, 1 tbsp
Asafoetida (hing) powder, 1/2 teaspoon
Paprika, 2 teaspoons
Turmeric, 1 teaspoon
Water or stock, 4 - 6 cups

Over medium heat fry the ginger root, cardamom, cumin seed, coriander seed, sesame seed and mustard seed in ghee for 30 seconds. Add asafoetida, coriander powder, paprika and turmeric and mix well. Fry until mustard seeds are popping. Drop in meat, carrots, onions and yams. Mix well. Add the zucchini and mashed garlic. Fry for another few minutes, until everything is mixed well and then add the water or stock and bring to a boil. Return to a simmer and let cook, uncovered for the first hour or so, and then cover, for the remaining hour or two of cooking. When done, garnish with fresh chopped cilantro. Eat warm, served over freshly cooked basmati rice or quinoa.

In addition to nourishing foods, a number of herbs can be used to strengthen the woman post partum including

*Withania, Panax quinquefolium, Angelica sinensis, Asparagus racemosa, Avena sativa, Rehmannia glutinosa,*

and *Lycium barbatum.*

Very often the woman experiences some degree of perineal tearing during childbirth. To heal these wounds a sitz bath comprised of *Symphytum* root, *Calendula* flower, and *Plantago* leaf can be very helpful, and these or similarly vulnerary herbs can be prepared in a salve or cream and applied topically. To reduce the risk of infection these preparations can also be medicated with antimicrobial herbs such as *Hydrastis* and *Echinacea.* Helpful supplements include vitamins A, C, E and zinc.
Breastfeeding

Breastfeeding has so many benefits to both the mother and infant that it is shocking to consider that medicine once considered it unnecessary. In some parts of the developing world, in large part to support sagging formula sales in the West, the medical establishment and corporate interests are once again trying to convince women that formula is somehow better than breast milk.

Years of research has clearly established that breast milk is the best form of nutrition for human infants, demonstrating that breast-fed infants have lower rates of hospital admissions, ear infections, diarrhea, rashes, allergies, and other medical problems, compared to formula-fed babies. Human milk contains the optimal balance of proteins, fats and sugars for infant development, and over a 100 different ingredients not found in formula. Although some mothers might claim so, and somewhat strangely are supported in their contention by the attending physician, infants are rarely allergic to their mother's milk, although they may have reactions such as digestive upset or skin rashes to something the mother eats. When the mother eliminates this food from her diet the problem resolves on its own.

Breast milk contains an armory of immunoprotective antibodies protecting the baby against opportunistic infection, and ensuring proper growth and development. Breast-fed babies have also been shown to contain higher levels of beneficial bacteria than formula-fed babies. Breastfeeding ensures proper jaw development as it is more difficult to express milk out a breast than a bottle, and the baby has to work harder, strengthening the jaws and promoting the growth of straight, healthy teeth. Nursing also has psychological benefits for both the mother and infant, creating intimacy and early attachment, which encourages proper growth. Breastfeeding immediately after birth also promotes the continued release of oxytocin, which stops hemorrhaging and promotes the involution of the uterus.

There are some other obvious benefits to breastfeeding, including the convenience and cost, with no bottles to
sterilize and no formula to buy, measure and mix. Lactation promotes a sense of well-being for the mother through the release of mood-elevating endorphins. Regular breastfeeding encourages the new mother to get rest, settling down with the baby several times a day. Lactation can reduce ovulation, and while it is not a fool-proof contraceptive method, many women will experience a window of between 3-12 months in which she is not fertile. This is definitely not a form of birth control that can relied on though. Lastly, breastfeeding has been shown to reduce the risk of breast cancer (Daniels et al 2004), and as it delays the onset of menstruation, decreases a woman’s lifetime overall exposure to fluctuating estrogen levels that is thought to be a cause of other reproductive cancers.

Most women are able to produce adequate milk if the baby nurses frequently, but some women cannot. This can be addressed in two ways: by treating the underlying vital deficiency, and by enhancing breast milk production. To enhance the vital energy of the body nervine trophorestoratives, rasayanas and fu zheng herbs are used. To enhance breast milk production specifically galactagogues are used, including Asparagus racemosa, Cnicus benedictus, Borago officinalis, Foeniculum and Humulus. The latter is also found in beer, and particularly dark beers such as stouts and porters, which are useful galactagogues as well.

Sometimes the breasts become sore, inflamed and infected (mastitis). For cracked, sore nipples the regular application of ghee and other nutritive oils such as coconut and olive can be helpful, as can aloe gel (from the fresh plant) or a salve of vulnerary herbs (e.g. Calendula, Symphytum, Plantago), the latter two usually needing to be washed off first before feeding. If the nipples have thrush then the application of yogurt, or a cream prepared from Tabebiua, Berberis and Echinacea can be used: often the baby needs to be treated as well, by using a similar cream for diaper rash, and the mother must follow an anti-Candida diet (no flour, sugar, dairy or fermented foods), as well as take probiotics. For sore swollen breasts alternating hot and cold water hydrotherapy can be helpful, as can a fresh plant poultice of Viola leaves, Althaea root or Symphytum root. To treat mastitis a cream prepared with Echinacea root and Phytolacca root can be applied (20% v/v), and Echinacea
root taken internally as a tincture, 3-5 mL thrice daily. In all cases ensure that the breasts and nipples get adequate ventilation and sunlight, and ensure that the baby is latching on properly.

If breast feeding is an impossibility, the next best thing to human milk is goat’s milk. Use the following formula for infant feeding:

**Infant formula (0-4 months)**
Organic full fat goat milk, 750 mL
Filtered spring water, 250 mL
Cod liver oil, 2 tsp, containing:
- vitamin A, 3000 IU
- vitamin D, 1000 IU
- EPA, 1000 mg
- DHA, 1000 mg
Vitamin B complex, liquid (or dissolved tablet), containing:
- thiamine (B1), 100 mg
- riboflavin (B2), 100 mg
- niacinamide (B3), 100 mg
- pantothenic acid (B5), 100 mg
- pyridoxine (B6), 100 mg
- cyanocobalamin (B12), 100 mcg
- folic acid, 1 mg
- choline, PABA, inositol
Vitamin C (calcium ascorbate), 1 g
Vitamin E, liquid, 800 IU
Liquid iron, 20 mg
Hemp oil, cold-pressed, 2 tsp
Coconut oil, 4 tsp
Probiotics (*Lactobacillus, Bifidobacterium*), 18 billion bacterium

Blend ingredients in a sterile container, and store in sterilized vessel in the refrigerator. Warm to body temperature (40 degrees Celsius) before serving. After the age of four months add one raw egg yolk (organic).
Part Four: Care of the Child

Often a minor problem prevented or fixed as a child will resolve a health issue so it won’t come back in adult years.

It should be remember that the strongest medicine for children (and often adults for that matter) is still a loving gentle hand. Children especially respond to a parents kiss as if it is almost a magical medicine. Sometimes it is enough just to tell a child that they will be alright and the incident is over.

Flower Essence can play a huge role here also. The use of Children’s Super Hug has had significant benefit for many families over the years.

Children’s Super Hug

This formula is specially designed for children ages 0 – 16 years old. Children’s Super Hug will allow the child to feel the world loves them and wants to give them a big hug. This formula of course can be used by any age, but we have found it beneficial to help during the cranky and irritable stages that children go through. It is specially designed to help the user feel more empowered. We most often use this formula in a spray form, as it can both be given orally and/or sprayed into a room where children are ‘acting up’ in order to get attention.

**Buttercup** – strengthens feelings of self-worth and ability to experience one’s own inner-light and uniqueness

**Chamomile** – reduces moodiness and irritability; releases emotional tension, especially in the stomach or solar plexus

**Chicory** – freely accepting love, strength and freedom without a need to be demanding, manipulative, or use attention-getting behaviour

**Yarrow, Yellow** – having inner protection while remaining open to others

**Self Heal** – a healthy, vital sense of Self; feeling a deep sense of wellness and wholeness

**Sunflower** – a balanced sense of individuality, and a sun-radiant personality

**Dosage** is 3 – 5 drops, three times daily or as needed. It can be made in glycerin, which make it more palatable for children. Often added to water or other liquids and sipped over a few hours.
Common neonatal disorders

The following is a list of common neonatal and childhood disorders and their treatment. All doses for internal treatments are given in the adult dose. There are a variety of methods to determine what an appropriate dosage is for a child, the most accurate of which is Clark’s Rule, which is based upon weight. An adult dose is typically based on a 68 kg (150 lb) individual: thus the child’s dose is whatever fraction their weight is of 68 kg:

\[
\text{weight of child} = \frac{\text{portion of adult dose}}{68 \text{ kg}}
\]

Thus a 15 kg child receives 22% of the adult dose. If the dose is 5 mL for an adult, the child would receive about a quarter of the adult dose, i.e. 1.1 mL, or 15-20 drops.

Children under one year that need to receive internal treatment are best treated through the mother, in which the medicinal compounds will be transferred to the child via the breast milk. On some occasions the children will need to be treated directly. As remedies such as powders, pills and capsules often present difficulties in administration, herbalists can take advantage of syrups and glycerites to enhance compliance. Sugar-free tinctures remain a very effective method of administration however, and can be mixed with water or masked in juice, or followed with another beverage or food. Homeopathic remedies, especially liquid ones, come in very handy here also.

Cleaning umbilical cord

- distilled Witch Hazel
- fomentation or bath with an infusion of Calendula and Symphytum
- *Plantago* and *Berberis* cream, 10% v/v; use a hypoallergenic cream
- *Myrrh* tincture, apply directly
Colic

- promote a calming and relaxed environment, e.g. lavender and vetivert aromatherapy, baroque and classical music; the mother must not be rushed or depressed
- smaller, more frequent feedings with plenty of skin-on-skin contact
- eliminate dairy, cereals, sugars, cruciferous vegetables and alliums (e.g. garlic), coffee, chocolate, tea, spicy foods and laxatives from the mother’s diet
- aromatic carminatives, e.g. Anethum seed, Foeniculum seed, Coriandrum seed, Pimpinella seed
- relaxing nervines, e.g. Nepeta leaf, Mentha spicata leaf, Melissa leaf, Matricaria flower
- aromatherapy, e.g. lavender, lemon balm and chamomile, infused into the surrounding, or added to a carrier oil and rubbed over infant’s abdomen

Diaper rash

- avoid rubber or nylon pants and change diaper often
- allow infant to go bottomless for most of the day, and expose buttocks to the sun
- for cloth diapers, wash diapers and covers with pure soap, and use 1/2 cup of apple cider vinegar in the rinse cycle
- baby powder, e.g.:

  white clay 150 g
  Althaea root, finely sieved powder 50 g
  Curcuma rhizome, finely sieved powder 20 g
  Apply topically with each change

- St. John’s Wort oil externally
- Salves or creams prepared with Calendula, Symphytum, Chickweed and Plantago
- zinc oxide externally to relieve irritation

Oral thrush

- mother must follow a Candida program
- clear up diaper rash
- apply yoghurt on nipples and on the buccal mucosa of baby’s mouth, or wash baby’s mouth out with a cotton swab and a 10% solution of water and baking soda; soak nipples in diluted apple cider vinegar
• for resistant cases, use equal parts *Berberis* and *Echinacea* tinctures, 2.5 mL
• avoid antibiotics

### Teething

- tinctures of *Spilanthes* and *Piper methysticum* applied on gums with a cotton swab
- bundle dried *Matricaria* flowers in unbleached cheesecloth, soak in hot water for 5 minutes and when cool, give it to baby to suck on; this can also be used in baths
- with colic: *Verbena, Matricaria, Valeriana, Passiflora*
- with cold sores and stomatitis: essential oil of sandalwood, 1 drop diluted in 1 tsp of almond oil, rubbed over gums and sores
- *Eschscholzia* tincture, 3-5 mL

### Cradle cap

- shave child’s head at one year, apply a thick coating of olive oil to the scalp and let it soak in overnight. The next morning use a fine comb to scrape off cradle cap and remove any residue with rose water and a cloth

### Infantile eczema

- put mother on an elimination diet
- omega 3 fatty acids, 1000 mg EPA and DHA daily
- oil massage with ghee, olive, coconut or sesame oils
- vitamin A, 20,000 IU daily
- vitamin E, 800 IU daily

### Otitis media

- avoid dairy, flour and sugar
- vitamins A, C, E and zinc
- warm *Verbascum* flower and *Allium* ear oil instilled in ear
- *Echinacea* tincture, the alcohol boiled off with a little hot water, applied externally
Tinctures of *Actaea* root or *Lobelia* leaf for pain, 3 mL thrice daily

Diarrhea

- common in summertime, linked to infection, heat and dietary indiscretions
- avoid dairy, flour and sugar
- oral rehydration
- aromatic carminatives: *Anethum* seed, *Foeniculum* seed, *Coriandrum* seed, *Pimpinella* seed
- antimicrobials: *Berberis, Terminalia chebula, Holarrhena*
- Carob powder, with sugar and hot water

Impetigo

- keep affected area clean with *Echinacea* tincture
- antimicrobials internally, e.g. *Echinacea, Hydrastis, Commiphora, Thuja, Phytolacca*
- vitamins A, C and E to speed healing and recovery

Lice (Pediculosis)

- both lice and eggs (nits) are visible to the naked eye
- when one person in the family is affected, everyone should receive treatment
- use a nit comb to remove nits, and in severe infestations, shave heads
- infected persons should not lend clothing
- essential oil formula, used in a carrier oil; do a patch test first to determine sensitivities:

  20 drops Eucalyptus
  10 drops Rosemary
  10 drops Juniper
  20 drops Lavender
  10 drops Geranium
  5 drops Lemon

  Place a plastic bag over the hair and leave on for 1-2 hours. Repeat three times a day at three-day intervals.
• Larkspur (*Consolida orientalis*) seed, made into a strong decoction. Allow to cool, and use to wet the head prior to shampooing. Use rubber gloves. Work into a thick lather, and leave on head for fifteen minutes, then wash down the drain. Application works best for the child to put their head backwards over the side of the tub or sink, and have somebody else apply the decoction and work in the shampoo. A little yucca juice concentrate added to the shampoo improves activity. Highly toxic: do not allow into eyes, nose or mouth.

**Bedwetting (Enuresis)**

• more common in boys, often occurring in stages during development; if chronic, look to father-son relationship
• try not to pressure or shame the child
• teach children the kegel exercise and get them to practice mid-stream stopping of urination, to strengthen the trigone muscle of bladder
• look at possibility of food allergies and sensitivities
• bladder tonics: *Verbascum* root tincture, 2.5 mL thrice daily
• if caused by nightmares or seems to have a “nervous” component, consider relaxing nervines and sedatives such as *Melissa, Valeriana* or *Scutellaria*
• fresh *Anenome* herb tincture for nightmares, 1-2 drops (standard dose for children and adults alike), before bed

**Measles**

This highly contagious acute disease has the symptoms of: fever, cough, coryza (head cold), conjunctivitis (pink eye, inflamed conjunctiva), and eruption of a spreading mucopapular cutaneous rash. Measles (a.k.a. rubella) is a viral infection that spread through physical contact or air bound through respiratory droplets. Usually a person only gets it once, but in rare case it can be seen twice in an individual.

The incubation period is 7 – 14 days, with communicability for 2 – 4 days before and up to 5 days after the rash appears. Flu-like symptoms appear 2 or so days before the red rash appears. The rash turns brownish, with peeling after 3 – 4 days. The child feels quite sick and miserable during the measles.
Herbal treatment is based on alleviation of symptoms and distress.

- **Diaphoretics:** help ease fever; Yarrow (*Achillea millefolium*), Catnip (*Nepeta cataria*), Linden (*Tilia sp.*)
- **Antipruritics:** to help with the itching; Chickweed (*Stellaria sp.*)
- **Demulcent expectorants:** for cough and sore throat; Coltsfoot (*Tussilago sp.*), Mullein (*Verbascum thapsus*), Licorice (*Glycyrrhiza sp.*)

 Temporary, but immediate relief from the itching can be obtained by dabbing Witch Hazel (*Hamamelis*) on the skin. Often it is necessary for the child to stay in a dark room due to eye sensitivity.

**Mumps**

An acute contagious viral disease that usually causes a painful enlargement of the salivary glands (parotids). It usually spreads by respiratory droplets. It is most often seen in 2 – 12 year olds. The incubation period is 14 – 24 days. It can happen in adults if they were not exposed in childhood and have been know to cause sterility in adult men.

The symptoms include: fever, swelling of parotid glands, aching and restlessness. The appearance of the child can change quite a bit and even appear alarming. About 20% of the male patience can also have testicle involvement, especially in adults. In some cases a mild meningitis marked with severe headaches and/or stiff neck should indicated immediate medical care.

Holistic treatment includes applying ice and hot packs on the neck for temporary relief. Often a person will reach for a pain reliever for the child. ASA should not be used as it might lead to Reye’s syndrome. Acetaminophen (Tylenol) is Ok for pain relief. Warm salt water gargles, soft food and lot of fluids will help reduce symptoms.

**Antimicrobials:** are key to successfully clearing infection, Coriolus, Echinacea

**Lymphatic:** Clevers (*Gallium*), Echinacea, Mullein (*Verbascum thapsus*)
**Alterative:** Echinacea, Clevers (*Gallium*), Nettles (*Urtica dioica*)

**Timetable for food introduction**

The first infant food should be breast milk. By about six months of age the child may begin to show an interest in regular food. To some extent the timeline for introducing foods is dependent upon tooth development. Fruits require little in the way of mastication and are an easily digested and tasty treat for babies. As the baby gets older progressively more complex foods can be added into the diet. As a general rule, all vegetables should be cooked, preferably steamed, as young children lack the teeth to properly masticate the fibers. It is important for the parents to introduce a diversity of foods into the child’s life as soon as possible, excluding of course refined foods, to ensure proper eating habits later on. The following is a loose timetable for the introduction of specific foods:

**6 months:** cherries (stones removed), blackberries, organic banana, applesauce, pears, seedless peeled grapes, sprouts; cooked and mashed beets, carrots and yams

**9 months:** nectarine, apples (peeled), papaya, cooked prunes, mashed potato, broccoli, peas, artichoke, cabbage, oatmeal, millet, rice, quinoa, amaranth

**12 months:** avocado, asparagus, onions/garlic (well-cooked), squash, chard, parsnips, blackstrap molasses, goat’s milk, barley, oats

**18 months:** buckwheat, leafy green vegetables, eggplant, fish, tahini, kelp, egg

**21 months:** oranges, pineapple, cashew, almond, meat, wheat, brewer’s yeast, egg, legumes (cooked with ginger), soft tofu

**24 months:** sunflower seed, pumpkin seed, sesame seed, peanut butter, corn, wheat
References


