You are about to embark in one of the most important journeys of your life... The creation of a new, unique and very special little person. These are very exciting and sometimes overwhelming times. The most direct way you and your partner can positively affect fertility, the course of pregnancy, the birth and the health of your baby is making intelligent and informed dietary, environmental and lifestyle choices even before falling pregnant.

### Essential Fatty Acids (EFAs)

**EPA/DHA** – The EFAs omega-6, omega-3 and their long-chain derivatives arachidonic acid and DHA are important for the optimal development of the rapidly growing baby. They are necessary for cell membrane and retina structure, liver and central nervous system development (begins 21 to 28 days after conception) and placental growth. In the mother they are needed for mammary gland and uterine growth. EFAs cannot be synthesised in the body and must be ingested through foods. Omega-6 fatty acids are easily obtained from the diet as vegetable oils however omega-3 (DHA, EPA) are often scarce. Supplementation is recommended prior to conception and during lactation.

### Vitamins

**Vitamin A** – Demands increase during pregnancy. Essential for cellular differentiation and proliferation, epithelial and connective tissue integrity, gene expression, immune system support and growth. Vitamin A plays a significant role in the development of the vertebrae, spinal cord, ears, eyes, heart and limbs. In men, optimal levels help maintain sperm count and motility. Deficiency is associated with male and female infertility and low birth weight infants. Caution – Very high levels of supplementation as retinoic acid (synthetic form) is associated with miscarriage and birth defects that affect the central nervous system, craniofacial, cardiovascular, and thymus development.

**Betacarotene** – Powerful antioxidant converted to vitamin A in the body. Good sources include orange/yellow fruits (i.e. apricots, peaches) and vegetables (i.e. carrots, pumpkin) and green leafy vegetables such as spinach.

**B vitamins** – Necessary for a variety of bodily processes such as energy production and metabolism of carbohydrates, fats and proteins.

**Vitamin B1 (thiamine)** – Required for energy production, neurotransmitter synthesis, nerve impulse conduction, muscle action, and collagen production (the body’s major structural protein). During pregnancy thiamine plays an important role in blood sugar regulation through glucose metabolism and insulin production. Low levels are associated with low birth weight infants.

**Vitamin B2 (riboflavin)** – Involved in energy production, metabolism of carbohydrates, fats and proteins, adequate immune function and general growth. In men riboflavin is necessary for healthy sperm motility. Low levels in pregnancy are associated with low birth weight infants (also vitamin A, E and folate).

**Vitamin B3 (niacin)** – Essential for energy production, blood glucose control and DNA integrity (synthesis, health and repair). Niacin helps lower cholesterol and is crucial for healthy skin, digestive system, nerves and adequate brain function.

**Vitamin B5 (pantothenic acid)** – Coenzyme-A (CoA) is the biologically active form necessary for energy production and the synthesis of protein, amino acids, neurotransmitters, fatty acids, steroids, and vitamins A and D.

**Vitamin B6 (pyridoxine)** – Necessary for carbohydrate, protein and fatty acid metabolism. Pyridoxine supports adequate blood sugar regulation, neurotransmitter synthesis, strengthens immunity and is needed for red blood cell production. Pyridoxine reduces PMS symptoms and PMS-related depression, supports the luteal phase of the menstrual cycle and lowers elevated prolactin levels associated with reduced fertility in women. Together with folic acid and vitamin B12 is involved in homocysteine metabolism; high levels of homocysteine are associated with early pregnancy complications. In addition to promoting normal full-term pregnancies pyridoxine is effective for morning sickness; women with adequate levels around conception are less likely to experiencing morning sickness during pregnancy.

**Vitamin B9 (folic acid)** – Required for adequate foetal development. Involved in DNA synthesis, cell division, repair of genetic material, neurotransmitter synthesis, nervous system health and homocysteine metabolism. Requirements double with pregnancy thus it is one of the most common vitamin deficiencies. Folate is recognised as an important nutrient prior to and during pregnancy preventing neural tube defects (NTD) by 80% (400-500mcg/day). Supplementation should begin three months prior to conception as NTD incidence occurs within the first 22 to 28 days of pregnancy. Women who used the oral contraceptive pill are at higher risk as it is known to reduce folate levels.

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**Vitamin B12 (cyanocobalamin)** – Essential for the activation of folic acid, cell growth, cell replication and production of red blood cells in the bone marrow. Involved in the formation of healthy DNA and nervous system tissue in conjunction with folic acid. Cyanocobalamin works as a natural antioxidant and is required for adequate homocysteine metabolism (with pyridoxine and B9).

**Vitamin C** – Strong antioxidant necessary for healthy immunity, connective tissue integrity (key role in collagen formation) healthy cell membranes (including sperm and ovaries), and improves dietary iron absorption (low levels are common in pregnancy). Vitamin C may assist in adequate blood pressure regulation during pregnancy (may reduce the risk of pre-eclampsia) and in men it promotes normal sperm and improves motility.

**Bioflavonoids** – Powerful antioxidants including rutin and hesperidin commonly found in vitamin C rich foods increasing its action. Bioflavonoids are important in cardiovascular health supporting capillary integrity and promoting circulation.

**Vitamin D3** – Essential for calcium absorption, skeletal growth (cartilage formation and calcium/mineral deposition in bone), cell growth and development, and healthy immune system. Deficiency leads to poor skeletal calcification and neonatal tetany and is linked with higher incidence of asthma, diabetes, autoimmune disease and cancers later in life.

**Vitamin E** – Important antioxidant that reduces free radical damage and maintains cell membrane integrity in the body. Essential for nervous and immune system development. Tissue reserves are low at birth so newborns, especially premature babies, are at risk of deficiency. Children with deficiency and not supplemented rapidly sustain nerve damage. Vitamin E is important for healthy fertility and gestation as well as healthy sperm production in men.

**Other vitamins** – **Biotin** is necessary for cell division, growth, DNA synthesis and metabolism of fatty acids and proteins. **Choline** is involved in cell membrane integrity, myelin sheath formation, neurotransmission, and healthy liver function. **Inositol** functions closely with biotin, choline, B6, folic acid and pantothenic acid. It is involved with nervous system signal control and metabolism of fats and cholesterol. Requirements increase during pregnancy and lactation.

### Minerals & Trace Elements

**Calcium** – Essential for development, health and maintenance of bone and teeth throughout life and in pregnancy. Around 30-40grams are transferred to the foetus throughout the pregnancy, mainly in the final trimester. Adequate calcium stores are required before conception to support maternal dental, musculoskeletal and nervous health. During pregnancy adequate levels regulate blood pressure and reduce prevalence of pre-eclampsia and leg cramps.

**Chromium** – Required for carbohydrate and lipid metabolism, cell division and growth (nucleic acid metabolism), and healthy blood glucose regulation (enhances the effects of insulin and reduces sugar cravings). Chromium works in conjunction with the B complex vitamins and magnesium to improve blood sugar control.

**Iodine** – Important for thyroid function health and brain and nervous tissue development. Common deficiency in pregnancy leading to a range of disorders including abortion, stillbirth, mental retardation, cretinism, increased infant mortality, goitre, and hypothyroidism. Still, excessive intake (>2mg/day) is harmful for both mother and baby.

**Iron** – Necessary for the oxygenation of tissues and the proliferation of immunity cells. Requirements significantly increase during pregnancy and cannot always be met by diet. It is the most common nutritional deficiency worldwide and the most common cause of anaemia in pregnancy. Deficiency enhances vulnerability to lead and cadmium in the environment and causes fatigue, impaired learning, memory and concentration. Secondary foetal complications include preterm delivery, low birth weight and maternal mortality. Vitamin C is essential for its absorption and molybdenum and copper are important for iron metabolism.

**Magnesium** – Together with calcium and vitamin D is essential for healthy bone, teeth and nervous system development in the baby and maintenance of these tissues in the mother. Adequate levels during pregnancy help reduce stress and prevent muscle cramps and premature contractions (relaxes the muscles in the womb). Magnesium also plays a role in regulating blood pressure, glucose, and insulin.

**Selenium** – Major natural antioxidant and free radical scavenger present in the body. Necessary for healthy thyroid and immune function. Adequate levels help maintain adequate blood pressure during pregnancy. Toxicity occurs in large amounts thus it is recommended to check with your health practitioner prior to supplementation. It is important in male fertility necessary for testosterone synthesis, semen formation and sperm maturation and motility.

**Zinc** – Essential for genetic expression, protein synthesis, collagen formation, neuronal signalling, and healthy brain and immune development in the baby. Zinc has antioxidant properties and improves insulin sensitivity. Around 82% of pregnant women worldwide do not consume enough zinc. Deficiency in pregnancy is linked with miscarriage, preterm delivery, low birth weight, birth defects, labour complications and higher risk of infant infections. Exceptionally important in male fertility necessary for testosterone synthesis, semen and sperm production, and adequate sperm motility; deficiency results in low testosterone levels and low sperm counts.

**Other minerals** – **Manganese** and **Boron** are needed for bone formation. **Manganese** supports carbohydrate and cholesterol metabolism; together with **Molybdenum** is essential in amino acid metabolism. **Copper** is involved in hormone and neurotransmitter metabolism and energy production. **Silica** necessary for connective tissue health (bone, cartilage, skin and nails).