Week 33 of pregnancy: immune system and lung maturation

Your baby at 33 weeks: growing, refining, preparing

At 33 , the fetus is usually gaining fat, practicing coordinated , swallowing amniotic , producing urine, and cycling between sleep and active periods. The continues to form complex connections, and the is improving its control over breathing-like , temperature regulation, and arousal patterns.

Although every pregnancy is individual, week 33 is close enough to term that many organ s are functional, yet still immature compared a full-term newborn. This distinction matters: babies born around this time often do very well modern neonatal care, but they may still need support for breathing, feeding, temperature maintenance, blood glucose regulation, jaundice, or infection monitoring.

The immune and lungs are among the most clinically significant areas of late-third-trimester development. They do not suddenly become mature in a single week; instead, they progress along a continuum. Week 33 is one point in a carefully choreographed transition from intrauterine support to independent life.

Fetal immune system maturation: building protection before birth

The immune system is not inactive. It contains developing innate and adaptive immune components, but it is also intentionally restrained. In the uterus, the fetus must tolerate maternal antigens, avoid harmful inflammation, and develop defenses gradually. This balance is essential because excessive inflammatory activation could be damaging in pregnancy.

One of the most important immune events in the is the placental transfer of maternal immunoglobulin G, or IgG. These antibodies cross the placenta through specialized receptors and provide the newborn with passive immunity after birth. This is one reason the timing of certain maternal vaccinations in pregnancy is clinically important: antibody levels in the pregnant person can influence the antibodies available to the baby in early life.

By week 33, antibody transfer is well underway and tends to increase as pregnancy advances. Babies born preterm may have received fewer maternal antibodies than babies born at term, which can contribute to greater vulnerability to some infections. This does not mean a preterm baby is unprotected, but it helps explain why neonatal teams are especially attentive to infection prevention and monitoring.

Fetal immune also involves immune-cell education. Cells such as T lymphocytes, B lymphocytes, macrophages, dendritic cells, and natural killer-like cells develop within a distinctive environment. Their responses are shaped to avoid excessive inflammation while still preparing for microbial exposure after birth, when the newborn’s skin, gut, and respiratory tract encounter the outside world.

The maternal immune system: tolerant, active, and precisely timed

Pregnancy is sometimes described as a state of lowered immunity, but that is an oversimplification. Research describes pregnancy as a dynamic immunological state: the maternal immune system adapts in a timed, tissue-specific way to support implantation, l development, fetal , and birth, while still maintaining defenses against pathogens.

During pregnancy, immune signaling changes across gestation. Natural killer cells, cytokines, T-cell subsets, regulatory immune pathways, hormones, and the

maternal microbiome all participate in this coordinated adaptation. Anti-inflammatory mechanisms are particularly important for fetal tolerance, but immune activation is not switched off. Instead, the body adjusts the intensity and type of immune responses depending on gestational stage and physiological need.

At approximately 33 , the maternal immune environment is supporting late fetal growth and preparation for delivery. Hormones such as estrogen and progesterone influence immune regulation, barrier function, and inflammatory signaling. The placenta also acts as an immunologically active organ, helping mediate communication between maternal and fetal compartments.

For the pregnant person, this immune recalibration may alter susceptibility, symptom patterns, or risk from certain infections. It is important to seek individualized advice about vaccines, exposure risks, fever, respiratory symptoms, urinary symptoms, or gastrointestinal illness. Treatment decisions in pregnancy always consider both maternal health and fetal well-being.

Lung maturation at week 33: surfactant and breathing readiness

The fetal lungs are among the last organs to reach full maturity. At 33 weeks, the lungs have made significant progress, but they are still developing structurally and biochemically. The airways and gas-exchange regions continue to mature, and the fetus practices breathing by moving amniotic fluid in and out of the lungs.

A central factor in lung readiness is pulmonary surfactant. Surfactant is a mixture of phospholipids and proteins produced by type II pneumocytes in the alveoli. Its role is to reduce surface tension, helping the tiny air sacs remain open after exhalation. Without enough surfactant, the lungs can be stiff and prone to collapse, contributing to respiratory distress in premature infants.

By week 33, surfactant production is usually increasing substantially, which improves outcomes if preterm birth occurs. However, lung maturity varies among babies and is influenced by gestational age, maternal health, fetal growth, infection or inflammation, diabetes, corticosteroid exposure when medically indicated, and other factors. Some babies born at 33 weeks breathe with minimal

help, while others may need oxygen, continuous positive airway pressure, or neonatal intensive care support.

If there is concern for preterm labor, clinicians may discuss interventions that are specific to the situation, such as monitoring, medications, or antenatal corticosteroids. These decisions depend on gestational age, cervical findings, membrane status, infection risk, fetal status, and maternal conditions. Do not self-treat suspected preterm labor; contact your healthcare team promptly.

What you may feel this week

More noticeable, rolls, stretches, or hiccup-like rhythmic.
Braxton Hicks that are irregular, usually mild, and often ease with rest or hydration.
Pelvic heaviness, backache, round ligament discomfort, or pressure under the ribs.
Heartburn, constipation, hemorrhoids, or bloating due to hormonal and mechanical changes.
Swelling in the feet or ankles, especially later in the day.

Immune protection after birth: why the third trimester matters

The first months after birth are a transitional immune period. Newborns begin to encounter microbes, develop their own immune memory, and establish a microbiome, but their immune responses remain immature. Passive protection from IgG is therefore especially valuable.

Third-trimester antibody transfer helps bridge the gap between birth and the baby’s own vaccine responses. This is one reason prenatal care often includes discussion of vaccines recommended during pregnancy, such as those intended to protect against pertussis, influenza, COVID-19, or respiratory syncytial virus in eligible settings, depending on local guidance, season, medical history, and availability.

These choices should be made with a qualified clinician who can consider your medical history, allergies, gestational age, previous immunizations, occupational or household exposures, and regional public health

recommendations. If you have autoimmune disease, immunodeficiency, transplant history, recurrent infections, or are using immune-modulating medication, individualized counseling is particularly important.

Supporting lung and immune development safely

Attend scheduled prenatal visits so blood pressure, fetal growth, urine findings, symptoms, and risk factors can be monitored.
Discuss recommended vaccines and the best timing for your pregnancy and local guidelines.
Seek advice promptly for fever, persistent cough, painful urination, unusual discharge, or known exposure to significant infections.
Monitor fetal movement according to your clinician’s guidance, and report a noticeable reduction or change.
Avoid tobacco smoke, vaping, and non-prescribed substances, as these can affect placental function and fetal respiratory health.
Ask before taking over-the-counter medications, supplements, or herbal products, especially if you have a medical condition or take prescribed medicine.