SCREENING FOR

FOETAL LUNG MATURITY

LAMELLAR BODY COUNT

NEWSLETTER

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Respiratory distress syndrome (RDS) is the leading cause of respiratory failure in neonates and a significant contributor to mortality during the newborn period.

Key insights on Foetal Lung development

The condition arises from insufficient production of **pulmonary surfactant by underdeveloped fetal lungs**, and the risk of developing RDS diminishes as gestational age increases (**see Fig. 1**).

- The inner surface of the alveolus is lined with a thin layer of fluid. The water in this fluid has a high surface tension, which tends to cause the alveolus to collapse.
- Pulmonary surfactant coats the alveoli's interior, reducing the surface tension of water, thereby enhancing lung compliance and preventing alveolar collapse during exhalation. A lack of adequate surfactant causes smaller alveoli to collapse, while larger alveoli become overinflated and stiff, ultimately leading to decreased ventilation and hypoxia.

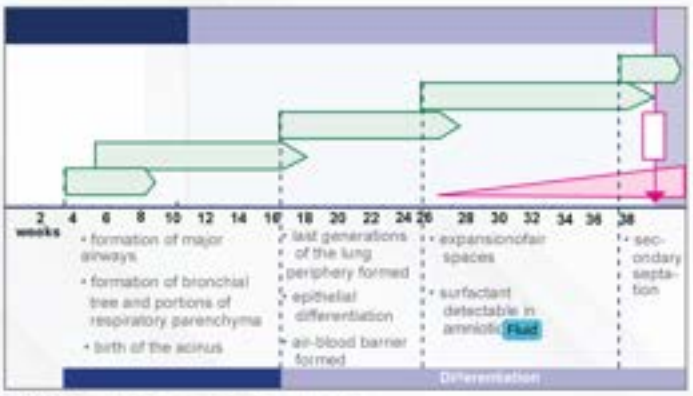

Fig 1. **Foetal lung development**

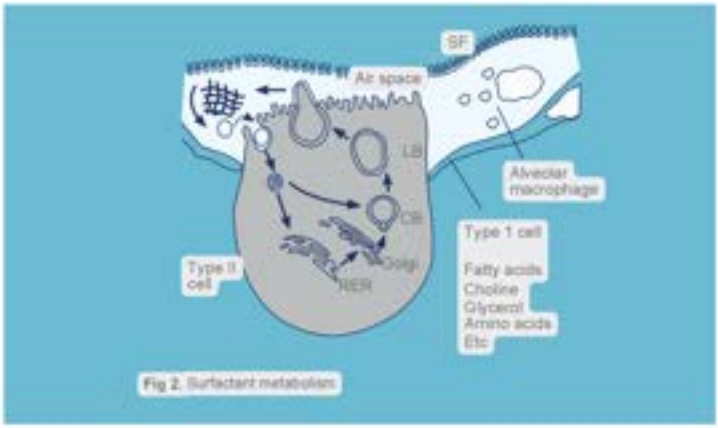

Fig 2. Surfactant metabolism

- Pulmonary surfactant is composed of approximately 90% phospholipids, such as phosphatidylcholine and phosphatidylglycerol, along with 10% protein. Type II pneumocytes store this surfactant in intracellular granules called lamellar bodies, which are released into the alveolar space via exocytosis.
- Once secreted, lamellar bodies become hydrated in the surface water layer and unravel to form tubular myelin(TM), a lattice-like structure composed of lipids and proteins that support the surfactant monolayer (Fig.2).

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Foetal breathing movements in utero expel pulmonary lamellar bodies and surfactant into the amniotic fluid. Surfactant and lamellar bodies appear in the amniotic fluid at 28-32 weeks of gestation and increase exponentially as gestation advances.

- Foetal breathing movements in utero expel pulmonary lamellar bodies and surfactant into the amniotic fluid. Thus, measuring amniotic fluid lamellar bodies or surfactant phospholipid components will help with the estimation of foetal lung maturity and risk of RDS during weeks 32 – 36 of gestation.
- By 37 weeks of gestation and later, the risk of RDS is so low that laboratory testing is not necessary, as foetal lung maturity is rarely a problem.

LAMELLAR BODY COUNT PRINCIPLE

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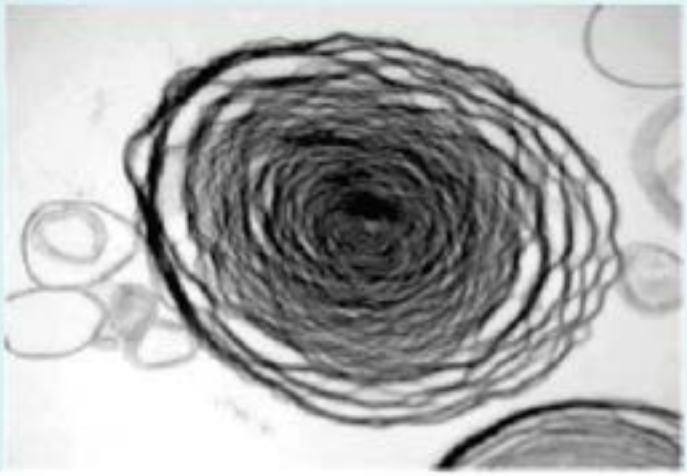

UNACCEPTABLE AMNIOTIC SAMPLES

Table 1 Interpretation of Lamellar Body Count

Lamellar Body Count	Interpretation
< 15 000/µL	Immature foetal lung
I 15 000 – 50 000/µL	Borderline mature foetal lung
>50 000/µL	Mature foetal lung

Specimens that are grossly contaminated with meconium, mucus and/ or blood.

Reference:
Szallasi, A Gronowski, AM. Eby, CS Lamellar body count in amniotic fluid: A comparative study of four different hematology analyzers, Clinical Chemistry 2003;49, p.994-997