

*“The Water of Life” . . .*

Religious, counterfeit and  
sonographic interpretations

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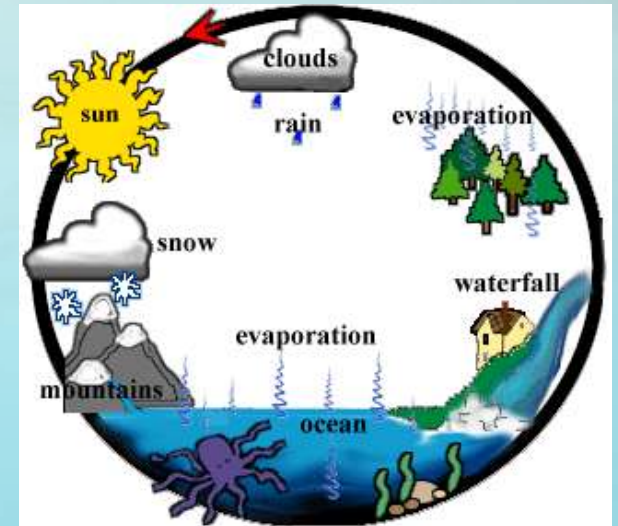
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# Objectives

- Attendees will:
  - Learn about a religious interpretation of the “water of life”
  - Understand how charlatans and lay persons interpret the phrase
  - Learn about the amniotic fluid “circulation”
  - Contrast the composition of fetal and adult urine
  - Review how to measure “fetal urine output”
  - Understand syndromes and anomalies that lead to too much or too little
  - Use amniotic fluid to determine fetal lung maturity
  - Image other substances in the amniotic fluid

# Context of “Water”

- Precious commodity taken for granted in our region because of its abundance (Great Lakes)
  - 75% of Earth’s surface area is covered by water
  - Free-flowing from taps and irrigation
  - Recycled naturally
  - Became bottled and sold relatively recently
- Not so abundant in Desert Southwest
- Lake Erie Algae bloom 2014
- Clean water supply not available in many areas of the World (Mexico!)



# “Water” in Biblical Times

- People usually lived along rivers and streams for water supply
- Clean potable water was not abundant – a valuable commodity
- Construction of viaducts and pipes
- Because it was a valuable commodity necessary for survival, it was used as a metaphor for “bounty”
  - We hear of “Water of Life” from ancient times
  - We don’t hear of “Gold of Life” or “Silver of Life”

# The Book of Revelation

- Reference to Water of Life in Revelation 22:1

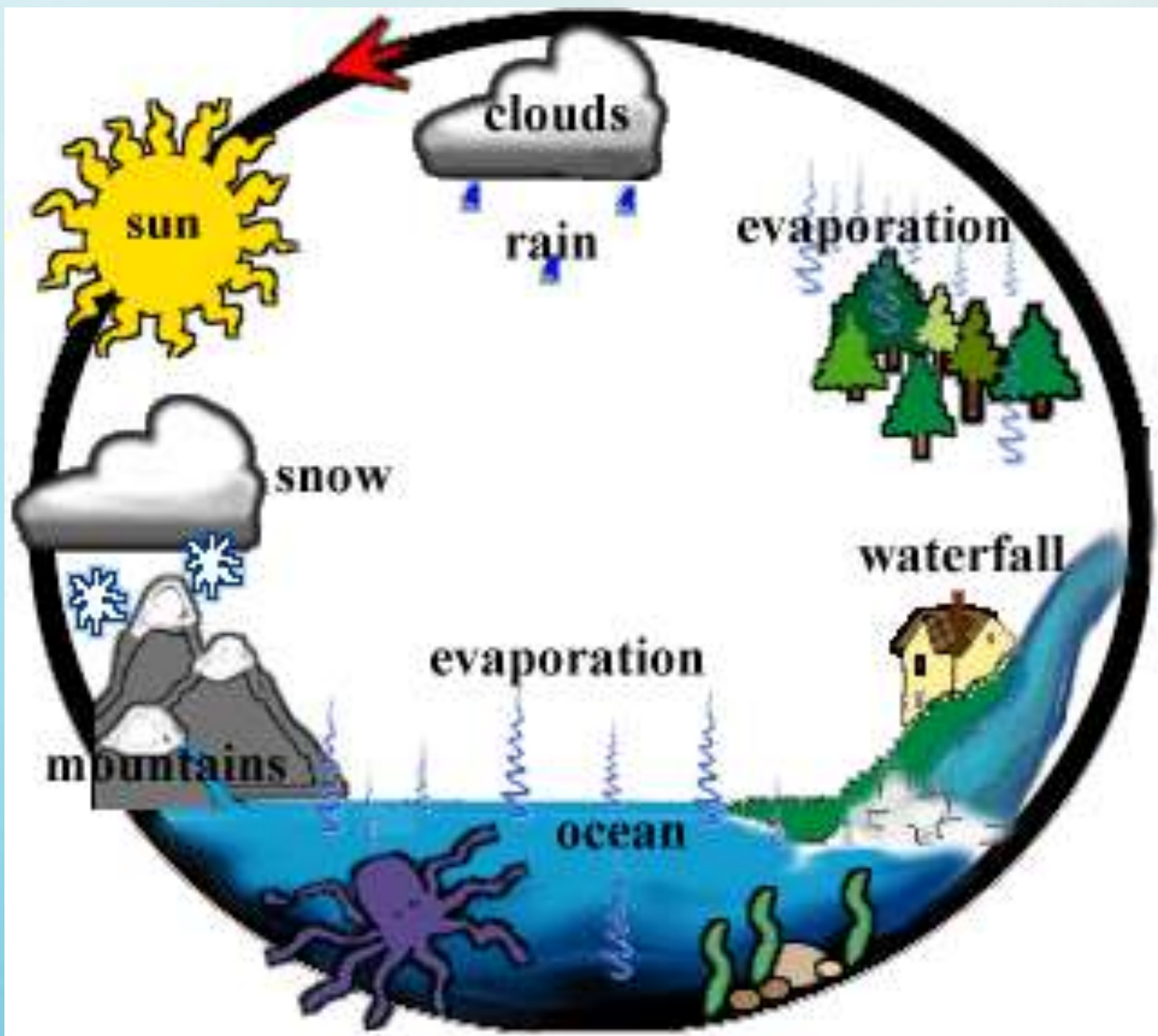
*“I will give unto him that is athirst of the fountain of the water of life freely”*

*“And he showed me a river of water of life, bright as crystal, proceeding out of the throne of God and of the Lamb”*

- Catechism of the Catholic Church considers the reference to the Water of Life as the Holy Spirit.

# The Gospel of John

- Passages John 4:10–26 are referred to the “Water of Life Discourse”
- Biblical scholars consider it to be a “single theme discourse”
- Interpreted as the theme of “Christ as the Life”





urine  
10¢

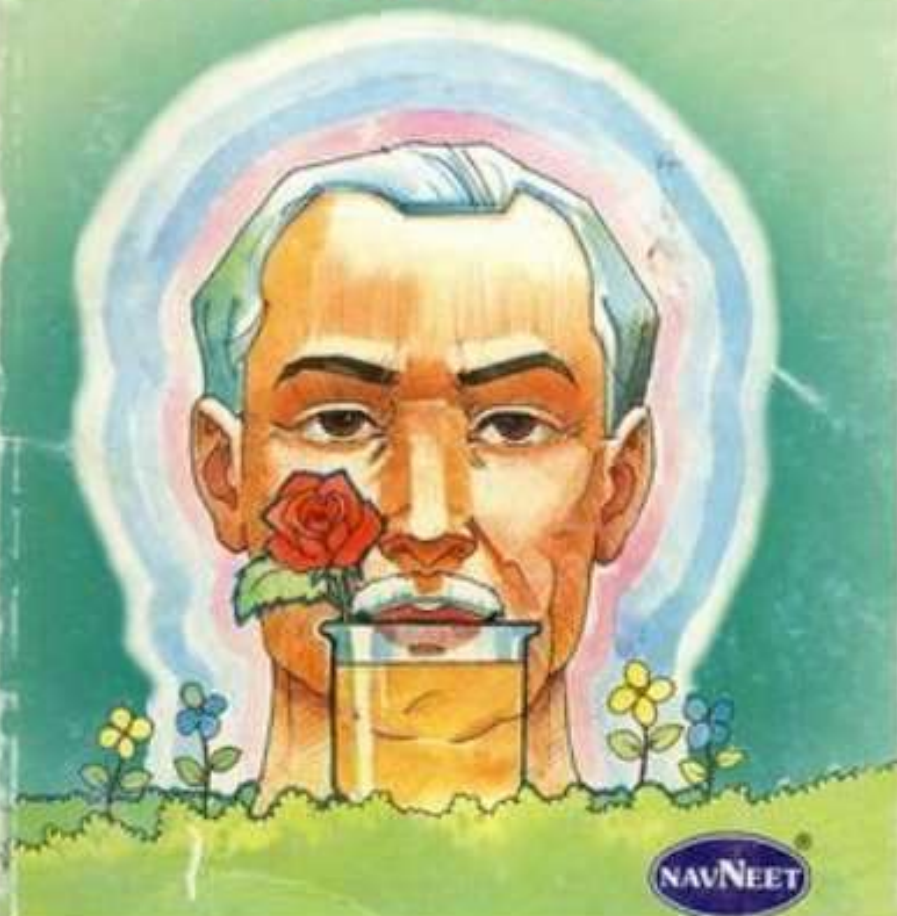


# Urophagia - Consumption of urine

- Promoted in several ancient cultures
  - Health
  - Healing
  - Cosmetic purposes
- Today – urine therapy known as a form of alternative medicine
- Consumed
  - Sexual activity
  - Ceremonial purposes



# AUTO-URINE THERAPY



NAVNEET

## AUTO-URINE THERAPY

- Has your illness resisted all kinds of treatment?
- Are there no specific medicines for your illness?
- Are you apprehensive about the side-effects of drugs?
- Have you despaired of life?

**DO NOT LOSE HOPE.**

**HAVE RECOURSE TO AUTO-URINE THERAPY.**

Our ancient Vedic works, too, have recommended the drinking of one's own urine. In the Damar Tantra, composed by Lord Shiva Himself, auto-urine has been described as 'Shivambu'. 'Shiva' means 'salubrious, or beneficial, and 'ambu' means 'water'. Thus the combined term 'shivambu' means salubrious water.

- A large number of supposedly incurable diseases have been successfully treated with self-urine. Cases of complete cure of even a disease like cancer have been recorded.
- The idea that urine is nothing but poisonous waste rejected by the body is a total misconception.
- Barring exceptional cases, fresh urine is always completely free from micro-organisms (bacteria) of all kinds.
- Urine contains hormones, enzymes, vitamins, and numerous other nutritive and curative substances.

**If we can drink the urine of cows, why can't we drink our own urine? Free your mind of the misguided disgust about urine and regain your lost health.**

A book containing a complete exposition of the scientific basis of AUTO-URINE THERAPY

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# Urine content

- Aqueous solution:
  - 95% water
  - Urea 9.3 g/L
  - Chloride 1.87 g/L
  - Sodium 1.17 g/L
  - Potassium 0.75 g/L
  - Creatinine 0.67 g/L
  - Other dissolved ions, inorganic and organic compounds





# Beer ingredients

- Water
- Starch Source
- Hops
- Yeast
- Clarifying Agent
  
- Alcohol 4 – 6%

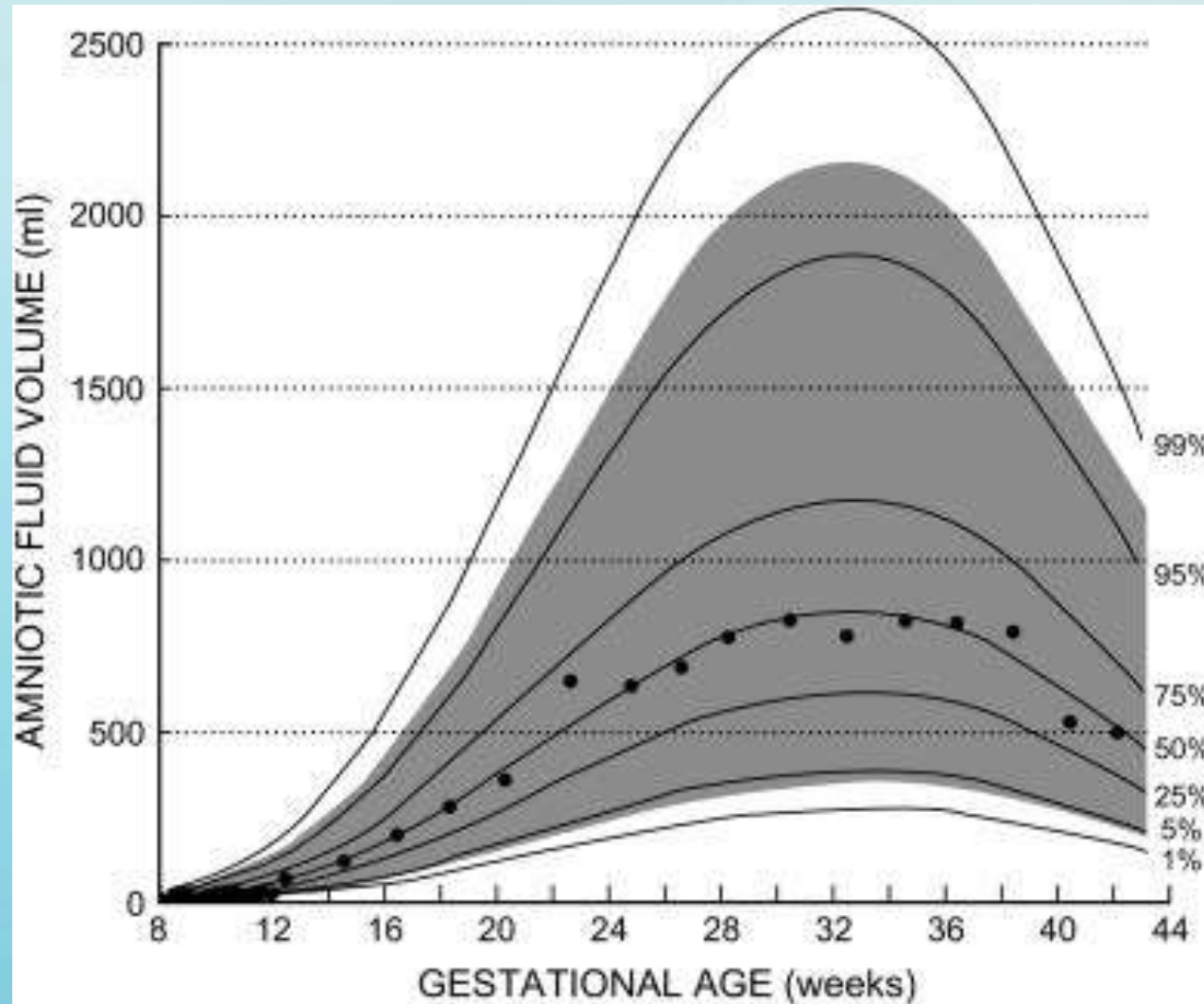




# Development of amniotic fluid

- Embryonic period of development
  - Water from maternal plasma (hydrostatic and osmotic forces)
  - 25 ml volume
  - Urine starts at around 8 weeks
  - Swallowing starts shortly thereafter
- Early fetal period
  - 400 ml by 20 weeks
  - Similar to fetal plasma (lack of keratinized epithelium)
  - Keratinization of fetal skin is complete by 25 weeks
  - By 28 weeks, volume is around 800 ml and plateaus

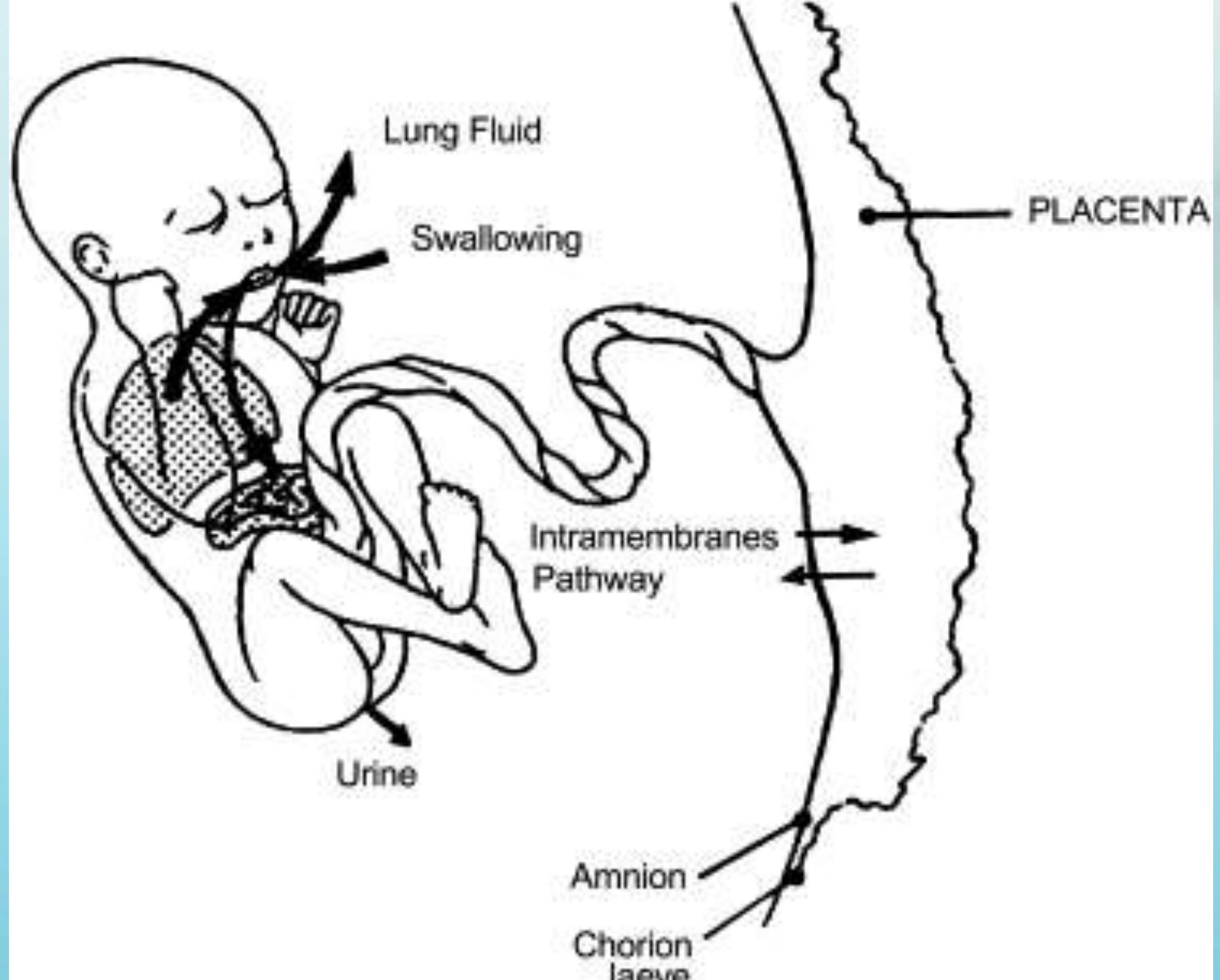
# Amniotic Fluid Volume in Pregnancy





# Amniotic Fluid Circulation

- Becomes important after skin is keratinized
  - Fetal urine (around 300 ml/kg; 600 – 1200 ml/day at term)
  - Secretion of oral, nasal, tracheal and pulmonary fluids (60 – 100 ml/day)  
Fetal Breathing Movements
  - Passive transfer of fluid and nutrients across the intramembranous pathway (200 – 500 ml/day)
  - Membranes (10 ml/day)
  - Fetal swallowing eliminates amniotic fluid



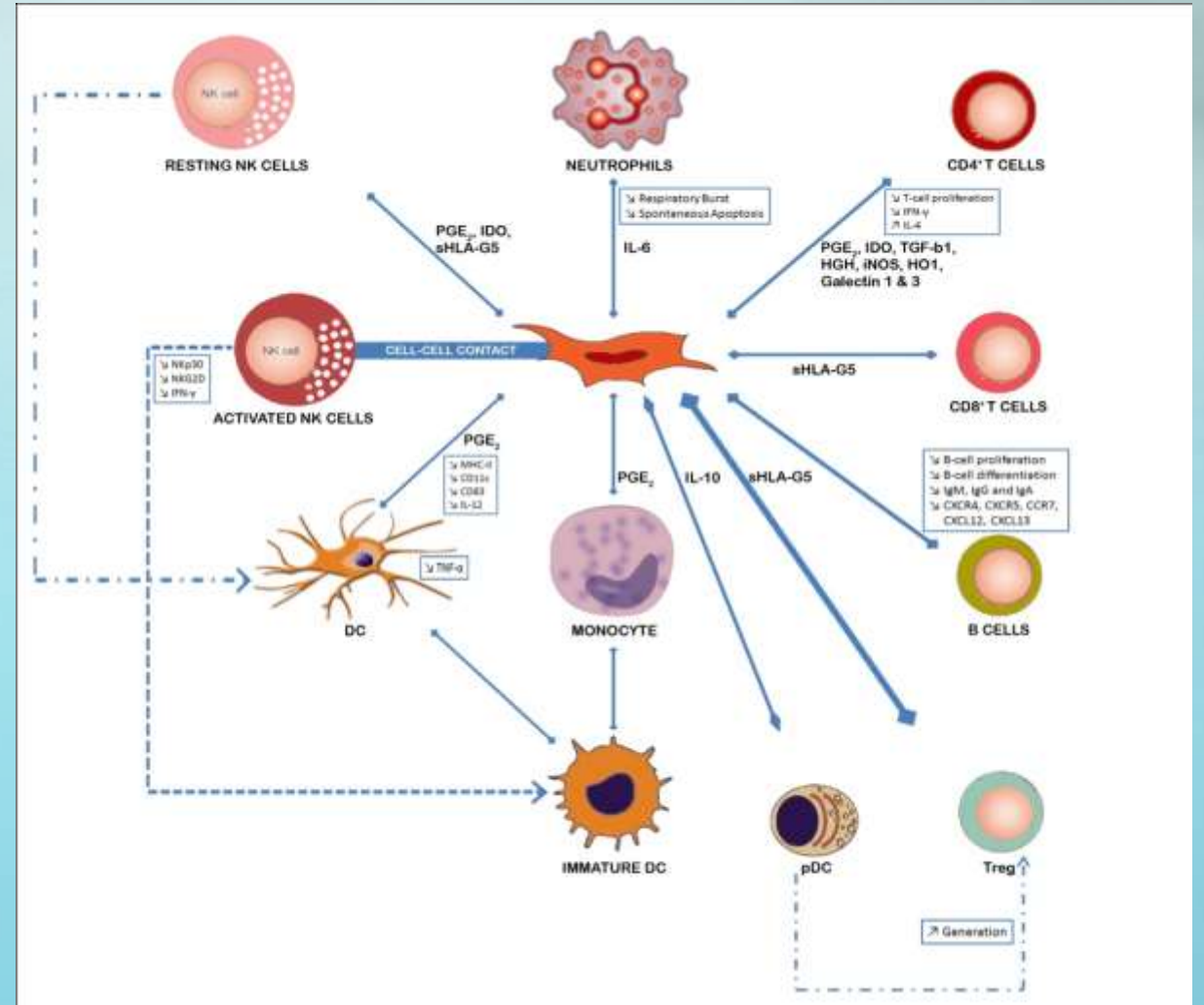


# Nutritive Functions of Amniotic Fluid (AF)

- AF contains carbohydrates, proteins and peptides, lipids, lactate, pyruvate, electrolytes, enzymes and hormones.
- Prior to keratinization of the fetal skin, amino acids diffuse from the placenta
- Like breast milk, AF is rich in taurine, glutamine and other amino acids important for rapidly developing cells
- Multiple growth factors and erythropoietin

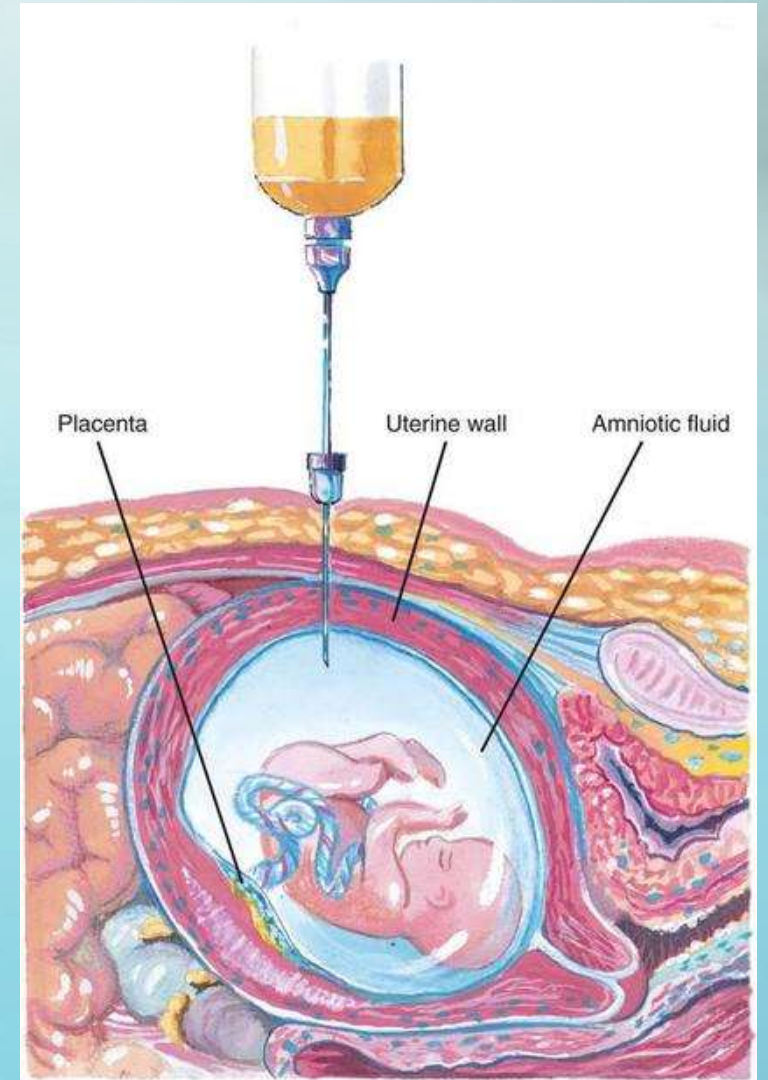
# Protective role of Amniotic Fluid

- Cushion
- Part of innate immune system
  - Chemical and cellular mediators



# Amniotic Fluid as a Diagnostic Medium

- Amniocentesis started in the 1970's
  - Fetal chromosomes originally
  - Open neural tube defects
  - Micro deletions
- AF bilirubin levels (delta OD 450)
  - Now mostly replaced by prenatal diagnosis
  - Middle cerebral artery Doppler
- Preterm labor and PPRM assessment (IAI)
  - Matrix metalloproteinase, interleukins, WBCs, bacteria
- CMV, toxoplasma, parvovirus B-19



# Amniotic Fluid for Lung Maturity

- Uncertain dates, medical complications, etc.
- Fetal breathing movements release lung contents (phospholipids)
- Lamellar Body Count (little packets of surfactant)
- Lecithin/Sphingomyelin Ratio (L/S ratio)
- Phosphatidylglycerol (PG)

# Biophysical Profile

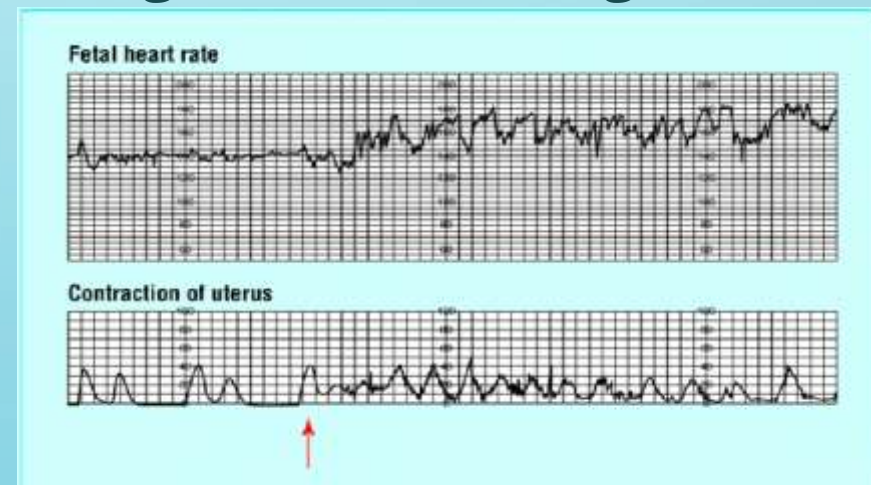
- 5 components
  - Fetal Heart Monitor assessment (Non-stress test)
  - Fetal movement (same thing)
  - Fetal tone (same thing)
  - Fetal breathing (same thing)  
*(What develops last is lost first!)*
  - Amniotic fluid volume (AFI or MVP) (a measure inconsistent with the others, **better for historical assessment**)



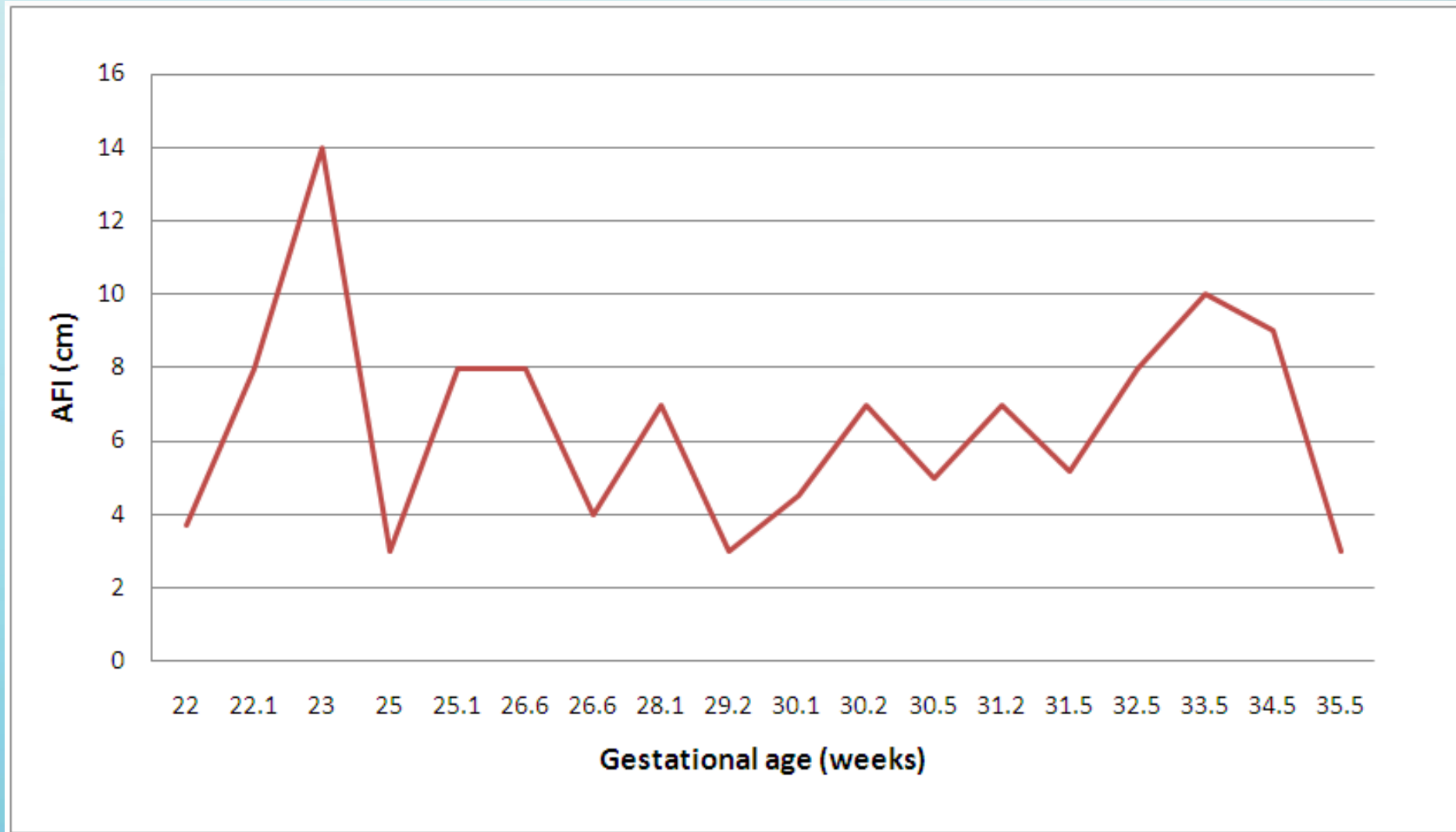
# Modified Biophysical Profile

- Non-stress test
- Amniotic fluid assessment (AFI)

Shown to be just as effective in monitoring fetal well-being as a full BPP!



# AFI variations with pregnancy . . .



# Amniotic Fluid Index

- AFI between 8 – 18 considered normal
- Median AFI is approximately 14 from 20 – 35 weeks
- AFI < 5 considered oligohydramnios (5<sup>th</sup> percentile)
- AFI > 20 – 24 considered polyhydramnios

# Too much amniotic fluid . . .

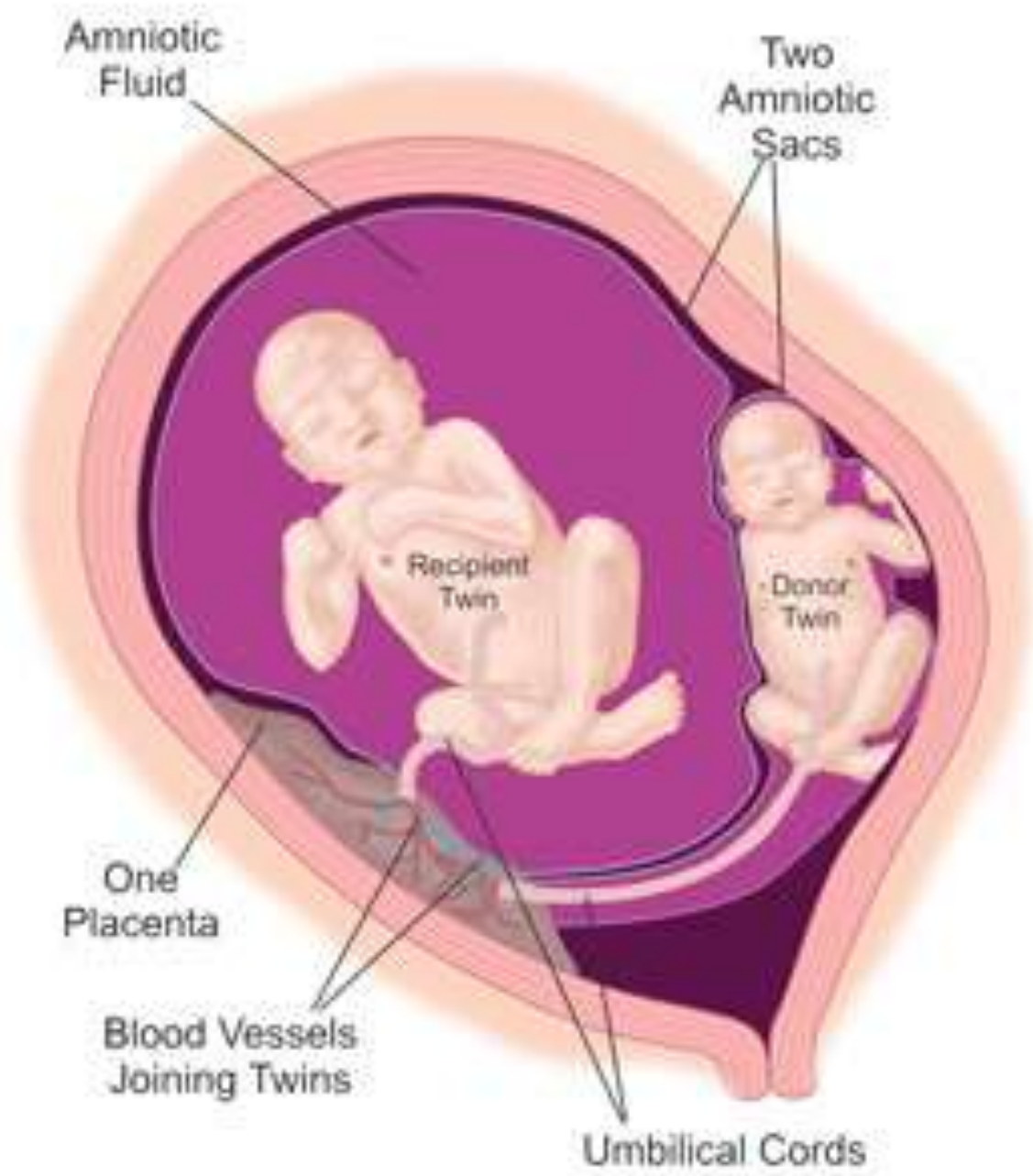
- Polyhydramnios – AFI > 24 cm (or MVP > 8 cm)
- Chronic and acute types – usually not a problem unless severe
- Common causes:
  - Most are idiopathic
  - Intrauterine infection (TORCH)
  - Rh -isoimmunization
  - Chorioangioma of the placenta
  - Maternal diabetes (with fetal hyperglycemia leading to polyuria)

# Polyhydramnios – additional causes

- Impaired fetal swallowing
  - Fetal gastrointestinal
    - Esophageal atresia,
    - duodenal atresia
  - Facial cleft
  - Neck masses
  - Tracheoesophageal fistula
  - Diaphragmatic hernias, others
- Fetal renal disorders – Bartter syndrome
- Fetal neurological disorders – anencephaly
- Fetal aneuploidies – T21, T18, skeletal dysplasias
- Monochorionic twins (transfusion syndrome)



# Twin-to-Twin Transfusion Syndrome







# Too little amniotic fluid . . .

- Oligohydramnios
  - AFI  $\leq$  5 cm ( or MVP  $<$  2 cm)
  - Causes:
    - Preterm PROM
    - Fetal growth restriction
    - Chronic placental abruption (amniochorionic separation)
    - Fetal anomalies (urinary tract obstruction)
- Anhydramnios – complete absence of AF

# Anhydramnios – renal agenesis



# Fetal akinesia sequence . .



# Extra substances in the amniotic fluid

- Meconium
  - Earliest stool of the mammalian infant
  - Unlike later feces, composed of components ingested during fetal life
  - Usually completely cleared within 24 hours of birth (source for testing)
  - May be passed before birth and only verified significance is a “patent anus”!
  - May be suspected on ultrasound and deserves reporting!
  - Meconium aspiration may occur with fetal gasping, so monitoring is important . . .
- “Sludge” – bacteria and wbc's

# Echogenic amniotic fluid . . .



# “Sludge”



# “Water of Life” Summary

- The phrase has religious and counterfeit meanings
- We take “The Water of Life” for granted in our daily lives
- The fetus is bathed in “The Water of Life” throughout gestation
- We can use our assessment of “The Water of Life” in our day-to-day practices
- Finally . . . I suggest that you drink beer in lieu of “The Water of Life”!

# “The Water of Life”

