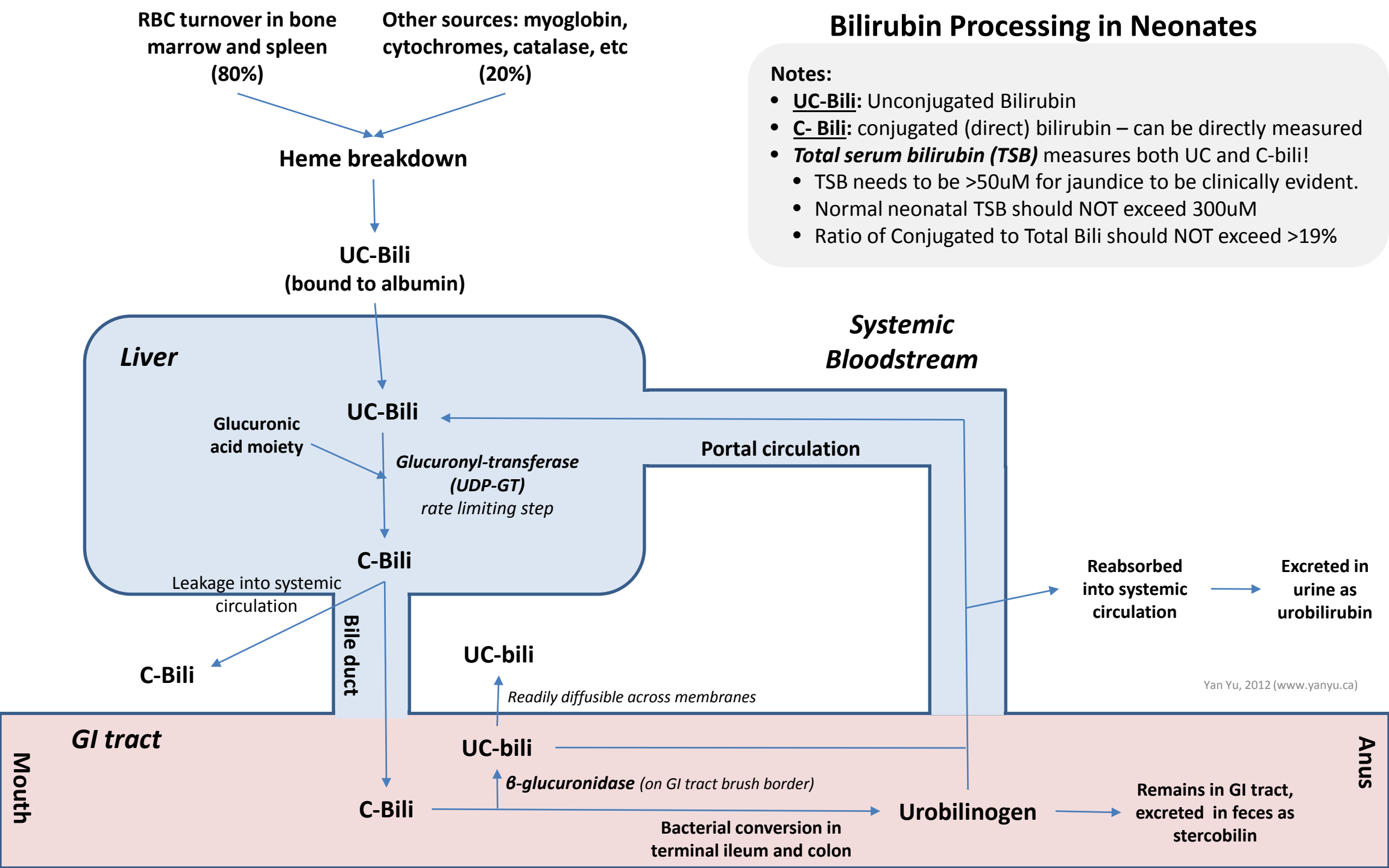


# Bilirubin Processing in Neonates

## Notes:

- **UC-Bili:** Unconjugated Bilirubin
- **C- Bili:** conjugated (direct) bilirubin – can be directly measured
- **Total serum bilirubin (TSB)** measures both UC and C-bili!
  - TSB needs to be >50uM for jaundice to be clinically evident.
  - Normal neonatal TSB should NOT exceed 300uM
  - Ratio of Conjugated to Total Bili should NOT exceed >19%



Yan Yu, 2012 (www.yanyu.ca)

# Approach to Pathologic Neonatal Jaundice

## Pathologic Neonatal Jaundice

- Jaundice before 24hrs old or persisting for 10-14 days
- Rapid rise in serum Bilirubin (rises by >80uM per day, peak > 350uM, Direct/conjugated bili >30uM, or > norm for gestational age)
- White stool, bright yellow urine

### 1. ↑ Production of unconjugated bilirubin

#### Intrinsic RBC causes (extravascular hemolysis)

RBC Enzyme/Hgb abnormalities (i.e. G6PD, thalassemia)

RBC Structural issues (spherocytosis/ eliptocytosis)

RBC iso-immunization (hemolytic dx of the newborn: ABO, Rh, etc incompatibility)

#### Causes extrinsic to RBCs

Breakdown of extravascular blood (cephalohematoma, IVH, Subgaleal hemorrhage, hematomas)

Polycythemia (↑ Hgb breakdown): transfusions, delayed cord clamping, maternal DM

DIC (excessive bleeding)

### 2. ↓ Conjugation of unconjugated bilirubin

Prematurity (immaturity of UDPGT enzyme)

Sepsis

Drugs

Neonatal hypothyroid

#### Genetic UDPGT defects

Gilbert's (5-20% of population): Partial UDPGT dysfunction

Crigler-Najjar Syndrome: Rare, complete UDPGT dysfunction

### 3. ↓ Elimination of conjugated bilirubin

#### ↓ GI motility

(Inadequate) Breastfeeding Jaundice (small volume colostrum, poor latch/suckle, breast agenesis/surgery, sheehan syndrome)

GI obstruction/ Ileus

Starvation

↑ transit time and deconjugation of conj bili in GI tract → ↑ Reabsorption of bilirubin from GI tract

#### ↓ secretion of bili from hepatocytes into bile ducts

Hepatitis

Drugs (ie. EtOH)

Obstruction of biliary ducts (either in or outside the liver), ↓ bili secretion into GI tract → Biliary Atresia

High UNCONJUGATED (Indirect) Bilirubin

High CONJUGATED (Direct) Bilirubin