Diving by Marine Mammals
(Text Ch 24)

How do they dive?
Why?
Are all dives the same?
Are all species the same?

For Reference:
Humans can dive about 100m for 3.5 min with assistance

Weddel Seal Dives

Percentage of dives (%)

Depth of dive (m)

0 5 10 15 20 25 30
0-50 51-100 101-150 151-200 201-250 251-300 301-350 351-400 401-450 451-500 501-550 551-600
Diving by Marine Mammals

Challenges:

1. Pressure
   What is pressure on animal at 500m?
   Role of nitrogen?

2. Oxygen Deficit

3. Temperature?
   (blubber, breathe air)

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Solutions:

1. Pressure
   Collapsible thoracic cavity
   Collapsible lungs
   Nitrogen?
      Prevent decompression illness
   Oxygen?
      Released from lung on assent!

Deep divers exhale first!
Solutions:

2. Oxygen Deficit
Bradycardia
(1800s: duck diving 100→14 bpm)
Regional Vasoconstriction
Regional Anaerobic Metabolism
Reserve blood for Heart and Head

More Blood Volume, Hemoglobin
Much more Myoglobin
RBCs shuttled to and from SPLEEN!

Tolerate lactic acid increases

Most dives are shallow
Long dives require more surface time
Diving by Marine Mammals

**Diving Reflex:**
- Bradycardia
- Reserve blood for head, heart
- Regional Vasoconstriction
- Regional Anaerobic Metabolism

**Aerobic Dive Limit:**
- Dive length which does not elevate lactate above resting

**Lab Artifact:**
- Depth, length, voluntary?