Diving by Marine Mammals

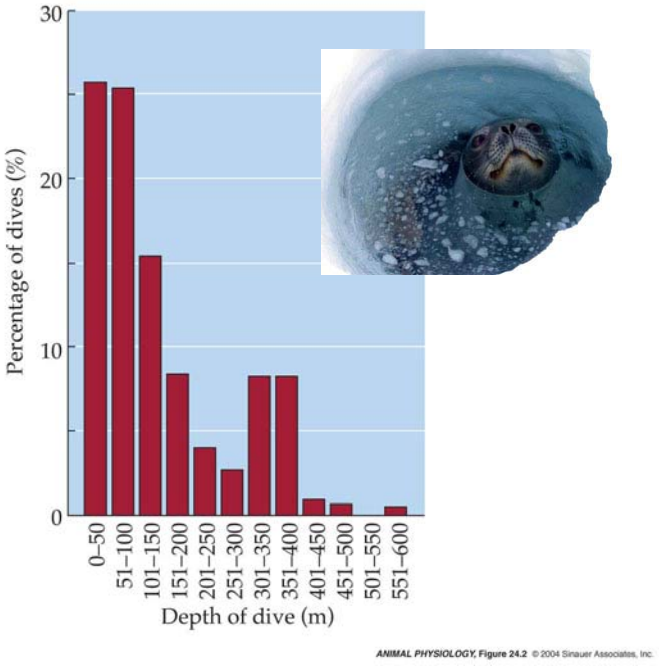
(Text Ch 24)

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



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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Diving by Marine Mammals

Solutions:

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

Deep divers exhale first!

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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

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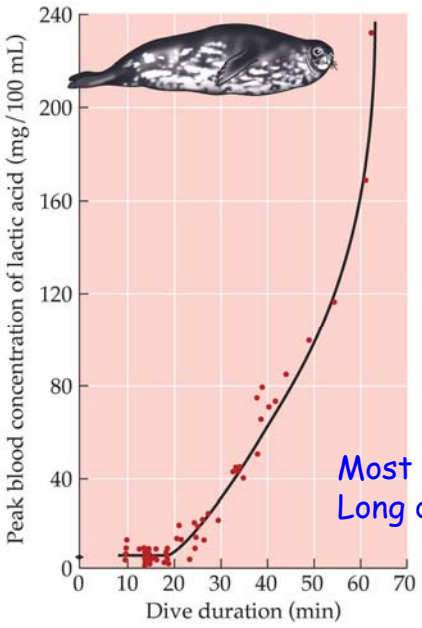

Most dives are shallow
Long dives require more surface time

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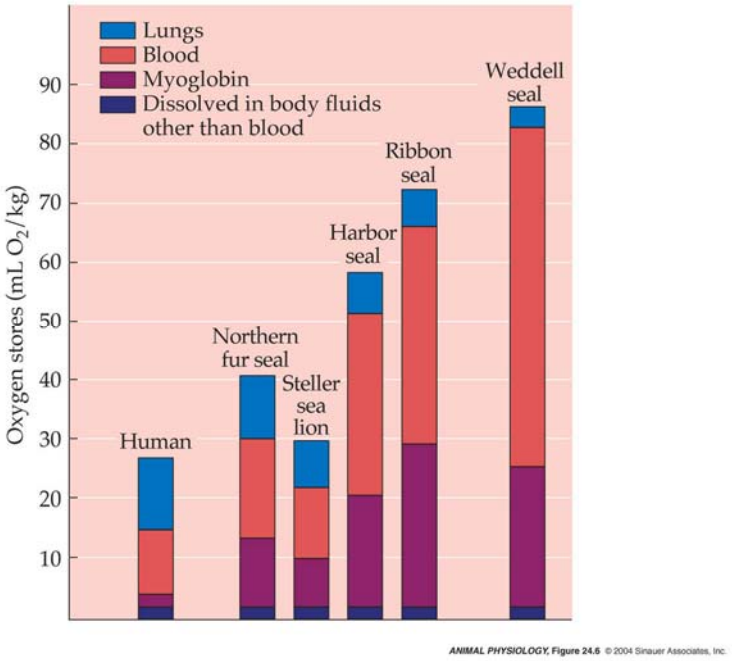

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Diving Reflex:

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?