Adaptations in Diving Marine Animals: Cetaceans, Pinnipeds, and Penguins

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**Developing hypothesis**

* Both deficiency of oxygen and increase in levels of carbon dioxide in the blood stream and tissues might be involved in regulating breath-holding phenomenon and resistance to asphyxia as aadaptation measures in diving marine animals

**Observations**

* Diving marine animals share cardiopulmonary physiology with that of terestial mammals
* Capability to hold breath, reduced metabolism, production of energy through anaerobic means and resistance to asphyxiation
* Sharp contrast with the land dwelling mammals along with humans

**Identifying the model organism**

* Model taxon; monophyletic group of species
* Phylogenetic associations identified by differences among homology and analogy

**Literature review**

* Developments that contribute to breath holding and resistance against asphyxia
* Physiological developments and survival mechanisms
* Generalizations about diving manners

**Comparative analysis**

* Human response and survival cababilities under extreme environmental circumstances
* Physiological ecology along with human physiology
* Comparison among diving and non-diving animals

**Experimental studies**

* Insertion of respirometer tube in the mouth of the organisms
* Implanting canula for collecting blood samples
* Remote sensing devices

**Data callibration and result compilation**

* Blood pressure calculation
* Hemoglobin level analysis
* Heart rate determination
* Breathing rate calculation
* Anerobic muscle activity
* Oxygen debt calculation

**Drawing conclusions**

* Based on the results of different experimental studies
* Agreement or disagreement with the proposed hypothesis.