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*Physical constraints on the mammalian brain evolution: viewed from marine mammals*

All mammalian brain follows the same principal construction plan. For example, all have a readily recognizable cerebral cortex, a cerebellum in the back of the brain, and a brainstem that is contiguous with the spinal cord. However, within this order we find a high degree of diversity. For instance, brain size varies by a factor of approximately 100,000 (0,1g in some bats and insectivores upto 9000g in sperm whales). Mammalian brains come also in a high variety of shapes and degrees of gyrification, e.g. gyrified vs. lissencephalic; elongated vs spherical.

The question arises what influences the evolution of mammalian brain? At least for primates it is widely assumed that social complexity is the primary driver of brain evolution; however recent studies indicate that this might be not the only and major factor that governs brain evolution and that the physical environment plays an important role. But specifics, in terms of what the physical environment can influence, are still mostly unknown. Therefore, we are interested in quantifying the strength of physical and environmental influence on the evolution of the mammalian brain, by investigating marine mammals, especilly the fully aquatic whales and the semiaquatic pinnipeds, in comparison to their closest land-living relatives. In this presentation.

To date we have first evidences that ambient temperature and pressure may play a significant role in shaping brain morphology. Contrary we could also demonstrate that other factors like the relation between cortical volume and area are preserved within all mammals irrespective of cortical gyrification and brain shape.