NORTH SEA VS BALTIC SEA-
COMPARISON OF IMMUNESYSTEM PARAMETERS
IN HARBOUR SEALS (PHOCA VITULINA)

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Introduction:
The increasing commercial use of the North and Baltic Sea results in accumulation of stressors influencing the ecosystem. The cumulative effects of these stressors could affect the immune system1 of marine mammals. Impairment of the immune function might be responsible for the increasing incidence of infectious diseases in marine mammals of the North and Baltic Sea2. To recognize possible changes in the immune system, a profile of pro- and anti-inflammatory cytokines, the acute phase proteins haptoglobin (Hp) and heat shock protein (HSP) 70 were investigated in blood samples of harbour seals from the North and Baltic Sea. Cytokines are soluble signal proteins that mediate information between cells, thus controlling the immune response and related mechanisms. They play a pivotal role in the activation, recruitment, and regulation of the cells that coordinate the immune response/reaction, such as inflammatory incidences and subsequent repair processes3.

Material and Methods:
Blood samples were taken from five free-ranging harbour seals at the Islands Helgoland in the North Sea and four free-ranging harbour seals at Anholt in the Baltic Sea. After RNA isolation expression of pro-inflammatory [Interleukin (IL)-1, IL-8, IL-12, Tumour necrosis factor α (TNF), interferon (IFN)γ], and anti-inflammatory cytokines [IL-4, IL-10, transforming growth factor (TGF)-β] as well as Hp and HSP 70 were analyzed using real time RT-PCR. The expression of the housekeeping gene GAPDH was used for normalization.

General Findings
► Highest mRNA expression was found for the pro-inflammatory cytokine IL-2, followed by IL-8, IL-1 and TGF-β.
► The cytokine profiles showed widely accordance in their expression profiles and only discreet differences between animals of the North and Baltic Sea. For most cytokines slightly higher mRNA expression levels were detected in samples from the North Sea.
► IL-8 and haptoglobin mRNA were found in higher amounts in animals from the Baltic Sea.

Conclusions
► only little differences in cytokine expression patterns of animals from Helgoland and Anholt were found.
► The biological relevance of these results needs to clarified in further investigations.
► Age and sex specific differences were not considered in these case study and are focus of further examinations.

References

Acknowledgements:
The authors would like to thank their co-workers at the FTZ, especially Henrike Seibel, and the colleagues in Denmark for the blood samples. Thanks to Dirk Schaudien for help with the statistical investigation.