# **Effects of Rising Carbon Dioxide Levels on Puffer Fish Sensory Receptors**

## Introduction

Most studies on the effect of CO2 level in the oceans has suggested that there is increased hypercapnic acid-base disturbance among marine animals (Heuer & Grosell, 2014). According to Heuer & Grosell (2014), there is documented evidence that shows impacts of CO2 levels over the past decades. For instance, CO2 concentration levels in oceans have affected behavioural endpoints and neurosensory, mitochondrial function, metaborate rate and otolith growth (Heuer & Grosell, 2014). The explanation for this phenomenon is as a result of increases in Pco2 and HCO2 in the body if fish during pH compensation (Govoni, Boehlert & Watanabe, 1986).

The impact of CO2 level varies across species, exposure period, and the concentration in the water bodies. Therefore, there is a various way through which this problem can be addressed to cope with hypercapnia (Heuer & Grosell, 2014). Understanding how the different pH compensation affect species can help us understand how puffer fish and other organism cope with the consequences of rising acidity waters (Shultz, 2015).

## Hypothesis

* This research paper aims at identifying the effect of increased carbon dioxide level on puffer fish sensory receptors.

## Methods

The study aims at collecting 10 adult puffer fish and examining their sensory receptors in varying temperature and PH. This is done so to mimic the different conditions of the oceans under varying PH and temperature. At the moment the ocean pH is estimated to be at 8.1 and which is projected to drop to 7.9 at the end of the century (Zhao, Song, & Wang, 2010). The oceans temperatures are estimated to be at around 25 degrees. The study will put three puffer fish in different pH and temperature varying from 25-30C. The pH will also be different for each group. Record the responses for each group over a period of 6 months. The record would include the response rate to inflate, how fast or slow they can swim away from predators, eating habits, their reproduction capability. The record of the of the different pH and temperature would then be compared with that of a controlled group of a constant temperature and PH.

## Intellectual Merit

There is need to understand the effect if changes in the Ocean pH due to increased CO2 levels (Wainwright, Turingan, & Brainerd, 1995). Moreover, the changing trend of puffer population is warrying and to identify the cause would help mitigate their decline in the oceans (Ando & Nagashima, 1996). The proposal also aims to find the extent to which acidity in the ocean affect sensory receptors of puffer fish and how they respond to the environment in different circumstances (Yadav & Singh, 1980).

## Broader Impact

There is need to advance knowledge on the effect of CO2 level in our waters. This is geared to help address environmental challenges that are affecting oceanic animals and plant. The study of the effect of acidity on puffer fish will help understand the general impact of CO2 on other fish species (Carpenter, 2002). Thus, the report of the study will revolutionize on the way CO2 is to be disposed to protect the marine ecosystem from human interferences.

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