Nutrition for saturation divers: Latest finding and future developments

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**Background: why do we need nutritional guidelines?**

<table>
<thead>
<tr>
<th>Challenges to the body</th>
<th>Practical challenges</th>
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<td>• Loss in body mass (particularly muscle mass)</td>
<td>• Chamber limiting daily physical activity</td>
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<td>• Disturbances to hydration status</td>
<td>• The environmental conditions (eg. Hyperoxia, helium and pressure)</td>
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<td>• Excess sodium loss</td>
<td>• Work shift patterns</td>
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<td>• Enhanced oxidative stress on key cells</td>
<td>• Underwater excursions</td>
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<td>• Possible period of immunosuppression (increase chance of cold and flu)</td>
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<td>• Reduced red blood cell concentrations</td>
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<td>• No vitamin D availability due to lack of sunlight (UVB rays)</td>
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Nutrition has the potential to support these physiological disturbance and therefore, support the health and performance of divers at work.
10 saturation divers volunteered for the study

18 d diving operation at a maximum working depth of 81 msw

Each diver completed $7.4 \pm 1.7$ underwater excursions on average during this operation, with an average underwater working period of $193.1 \pm 25.9$ min per excursion.
FIGURE 1 | Outline of the study protocol.
How does it compare to previous research?

Significant increase in energy expenditure (average 430 kcal) was observed regardless of magnitude of hyperbaric pressure, therefore suggesting the hyperoxic and helium atmosphere are principle drivers.
Saturation Divers Are Susceptible To A Negative Energy Balance

Consequence:
- Body weight loss (Busch-Stockfish + Bohlen, 1994)
- Increase likelihood of colds and flu (Brenner et al. 1999)
- Impaired cognitive function and decision making
- Early fatigue development during underwater excursions

Due to:
- Reduced food palpability (e.g. only fresh vegetables maintain their taste)
- Potential appetite suppression post lockout

Calories consumed may also reduce

Environmental factors
- Under water activity
- Daily activity
- BMR
Both the environment and underwater activity can influence energy expenditure of saturation divers.

Energy balance of saturation divers can differ, but with some divers susceptible to a negative energy balance.

Future research should consider diving operations of a greater depth and more intensive work schedule.

Wearable heart rate monitor devices may offer a solution to objectively monitor the intensity of underwater work and identify real time individual nutritional requirements of each diver.
Can the use of specific diets (such as a low FODMAP) be beneficial in reducing the hydrogen production in the gut during decompression?
Future directions: post dive recovery with nutrition

Commercial Divers’ Subjective Evaluation of Saturation

- Twenty-two (44%) of the divers who responded declared having headaches; near surface (44%) or after surfacing (56%).
- 71% reported post-saturation fatigue after their last saturation, 82% of them described it as typical and systematic after each saturation.
- Recovery was reported to normally take from 1 to 10 days.
CAN I TELL YOU ABOUT SCIENCE?

OK!
Thank you