Scientific Review Paper:
The Essential Role of Iodine in Thyroid Health

Summary

The thyroid is a gland in the neck that produces hormones which impact every cell of the body. These hormones require iodine to be made, and so a deficiency in iodine can lead to an underactive thyroid, or hypothyroidism. This can manifest with various symptoms, including unwanted weight gain, tiredness and fatigue, depressive feelings, sensitivity to cold, muscle discomfort, dry skin, and brittle hair and nails.

Abstract

Iodine is an essential nutrient that is required throughout life for the normal functioning of the thyroid. For this reason, insufficient iodine intake can lead to an underactive thyroid (hypothyroidism), which can subsequently result in a number of health detriments and unwanted side effects.

Iodine cannot be produced by the body and so must be consumed in the diet, with the main dietary sources being white fish and dairy products. However, with recent data demonstrating that consumption of plant-based alternatives is accelerating[i], the risk of iodine deficiency is greater than ever.

Finding natural solutions to the increasing prevalence of iodine deficiency that can suit all dietary needs and improve health outcomes is of vital importance. One of the most viable solutions is through the use of PureSea® seaweed ingredients within food, beverage and nutrition products to provide a good natural, plant-based source of iodine.

The role of iodine in thyroid function

The thyroid is part of the endocrine system and is responsible for producing and releasing hormones into the blood stream. The thyroid hormones are known as T3 (triiodothyronine) and T4 (thyroxine), with the numbers in the names representing the amount of iodine atoms in each hormone.

The thyroid hormones have an essential role in metabolism, meaning that they influence the rate at which cells within the body can use energy. If the thyroid produces more hormones than required, it can cause the metabolism to increase. Equally, if the thyroid is unable to produce enough hormones, the metabolism can be slowed down.

While excessive iodine intake can cause hyperthyroidism (an overactive thyroid), too little iodine in the diet causes hypothyroidism (an underactive thyroid) – with the latter being the most prevalent of the two.

Hypothyroidism

When the thyroid is not producing sufficient hormones, it is known as hypothyroidism – commonly referred to as an underactive thyroid. There are various reasons why hypothyroidism can develop, although it is often due to a diet that is insufficient in iodine.

Hypothyroidism can result in a number of damaging symptoms including unwanted weight gain, tiredness, feelings of depression, sensitivity to cold, muscle aches, dry skin and brittle hair and nails[ii]. Severe cases of deficiency can result in a disorder called goitre. This develops when the thyroid tries to keep up with the demand for iodine, but is unable to due to insufficient dietary intake. This results in the thyroid gland swelling, enabling more blood to pass through in an attempt to extract more iodine.

Iodine status

Despite iodine being an essential nutrient for thyroid function and subsequent wider health, around 1.9 billion people worldwide remain deficient in the mineral[iii]. Research demonstrates that the UK is one of just two high-income countries in which iodine deficiency prevails, and shockingly has a worse rate than several developing countries[iv]. Iodine deficiency is not only of major public health concern in the UK, but an EU funded study conducted by the Global Iodine Network concluded that Europe is now an iodine deficient continent[v].

The Scientific Advisory Committee on Nutrition (SACN) notes that there are certain groups which are at an increased risk of iodine deficiency, namely teenage girls and those following a plant-based diet[vi]. However, research clearly demonstrates that large numbers of pregnant women in the UK also have iodine intakes below the amount deemed as sufficient[vii].

Sources of dietary iodine

The most common dietary sources of iodine are white fish and dairy products. With a decline in fish and dairy intake, especially in plant-based and flexitarian diets, the risk of iodine deficiency is greater than ever before. Seaweed provides the only good natural and plant-based source of iodine.

Finding convenient and appealing ways to get seaweed into a diet can be challenging, as many people are unsure about how to include it as part of an everyday meal. For this reason, taking seaweed as a nutritional food supplement, or as an ingredient within foods and beverages is an ideal solution.

PureSea® is a brand of seaweed ingredients that measures the iodine levels of every batch and have evidenced stable levels of natural iodine over many years of production. The powders and granules are supplied in various formats, for ease of use in nutrition, food and beverage products. PureSea® provides safe and natural levels of iodine, allowing for EFSA approved health claims surrounding:

- Thyroid Health
- Cognitive Function
- Healthy Skin
- Energy Yielding Metabolism
- Development in Children
- Nervous System

Ascophyllum nodosum is the species of seaweed underpinning the PureSea® range. Every batch is measured and recorded to ensure consistent natural levels of iodine, as well as factors of safety and quality. In addition, research published in the British Journal of Nutrition compared PureSea® against an artificial source of iodine (potassium iodide), concluding that the iodine from PureSea® is released in a more sustained way, with more absorbed and less excreted by the body[viii].

Conclusion

Iodine is an essential nutrient, required for normal thyroid function and the subsequent effects that this has on wider health. This is critical within the UK and Europe, where research suggests there is a high level of deficiency. Tackling this issue could potentially be simple and cost effective through increased awareness and supplementation. One viable option is the inclusion of PureSea® seaweed in the diet through use in ingredients within food, beverages and nutrition products.

About the Authors

Dr Craig Rose is a marine biologist, founder and managing director of Seaweed & Co. Craig has worked commercially and on research projects on the benefits of seaweed for around 15 years, and leads several research projects with university partners, is on industry advisory bodies and has presented at numerous conferences and to the media.

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[i] Alae-Carew, C., Green, R., Stewart, C., Cook, B., Dangour, A.D. and Scheelbeek, P.F.D. (2022) The role of plant-based alternative foods in sustainable and healthy food systems: consumption trends in the UK. Science Of The Total Environment, 807(3).

[ii] NHS: https://www.nhs.uk/conditions/underactive-thyroid-hypothyroidism/symptoms/ (accessed March 2022).

[iii] Pearce, E.N., Lazarus, J.H., Moreno-Reyes, R. and Zimmermann, M.B. (2016) 'Consequences of iodine deficiency and excess in pregnant women: an overview of current knowns and unknowns', The American Journal of Clinical Nutrition, 104(3), pp. 918-923.

[iv] The Lancet (2016) Iodine deficiency in the UK: grabbing the low-hanging fruit. The Lancet Diabetes & Endocrinology, 4(6) pp. 469.

[v] EUthyroid Consortium's Krakow Declaration on Iodine (2018) Referenced in the Iodine Global Network Annual Report 2020.

[vi] SACN: Iodine and Health. https://www.gov.uk/government/publications/sacn-statement-on-iodine-and-health-2014. (last accessed 18th March 2022).

[vii] Woodside, J.V. and Mullan, K.R. (2020) Iodine status in UK – an accidental public health triumph gone sour. Clinical Endocrinology, 94(4) pp. 692-699.

[viii] Emilie Combet, Zheng Feei Ma, Frances Cousins, Brett Thompson and Michael E. J. Lean (2014), Low-level seaweed supplementation improves iodine status in iodine-insufficient women. British Journal of Nutrition, Vol. 112, Issue 5, pp. 753-761.

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