

**European increase in iodine supply and change in the pattern of nodular & autoimmune thyroid disease.  
Importance for patient care.**

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Depending on the availability of iodine, the thyroid gland is able to enhance or limit the use of iodine for thyroid hormone production. When compensation fails, as in severely iodine-deficient populations, hypothyroidism and developmental brain damage will be the dominating disorders. This is, out of all comparison, the most serious association between disease and the level of iodine intake in a population. In parts of Germany the increase in need of iodine during pregnancy was previously not met sufficiently, but no systematic studies have evaluated if this was associated with brain affection in children.

In less severe iodine deficiency, the normal thyroid gland is able to adapt and keep thyroid hormone production within the normal range. However, the prolonged thyroid hyperactivity associated with such adaptation leads to thyroid growth, and during follicular cell proliferation there is a tendency to mutations leading to multifocal autonomous growth and function. In populations with mild and moderate iodine deficiency, as found in many areas of Europe and Germany until recently, such multifocal autonomous thyroid function was a common cause of hyperthyroidism in elderly people, and the prevalence of thyroid enlargement and nodularity is still high. The average serum TSH tends to decrease with age in such populations caused by the high frequency of autonomous thyroid hormone production.

On the other hand, epidemiological studies have shown that hypothyroidism is more prevalent in populations with a high iodine intake. Probably, this is also a complication to thyroid adaptation to iodine intake. Many thyroid processes are inhibited when iodine intake becomes high, and the frequency of apoptosis of follicular cells becomes higher. Abnormal inhibition of thyroid function by high levels of iodine is especially common in people affected by thyroid autoimmunity (Hashimoto's thyroiditis), that may also be more common with a higher iodine intake.

**Conclusion:** Even minor differences in iodine intake between populations are associated with differences in the occurrence of thyroid disorders. Both iodine intake levels below and above the recommended interval are associated with an increase in the risk of disease in the population. Optimally, iodine intake of a population should be kept within a relatively narrow interval where iodine deficiency disorders are prevented, but not higher. Monitoring and adjusting of iodine intake in a population is an important part of preventive medicine.

When iodine intake changes, physicians should be prepared that diagnostic and therapeutical activities within the thyroid field will change.