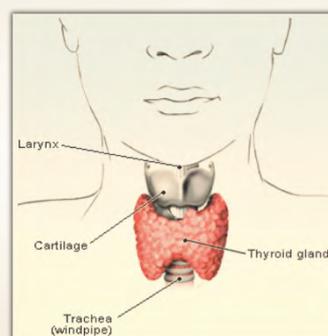


What is the thyroid gland?

The thyroid gland is situated in the neck just below the Adam's apple. It is part of the endocrine system and it has several critical functions:

- To control growth and development in early life (especially your brain ~ cognitive)
- To control the body's metabolism (the speed at which your body's chemistry functions – including the generation of hormones)
- To regulate cardiovascular function (how your heart works)
- To maintain homeostasis (your body's temperature)

Where is the thyroid gland?

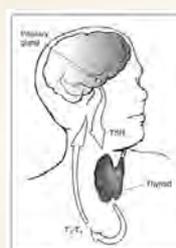


What does the thyroid gland do?

The thyroid gland uses iodine from your diet to make three key hormones that control your metabolic rate influencing healthy growth and development:

1. **Thyroxine (T4)**, a pro-hormone, which converts to T3 in the body
2. **Triiodothyronine (T3)** which is required by all the body's cells and tissues
3. **Calcitonin** which works with parathyroid (PTH) hormone to maintain blood calcium levels

Thyroid > Hypothalamus > Pituitary > Thyroid

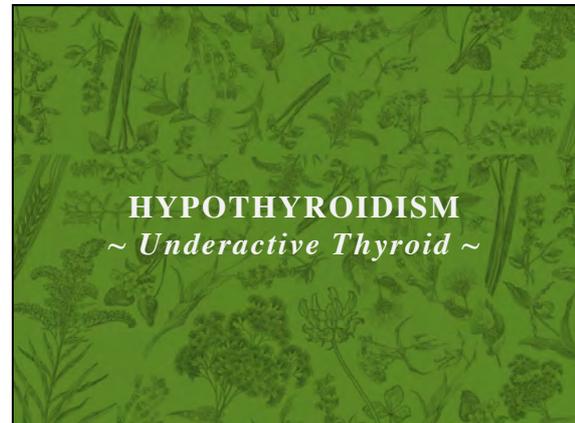
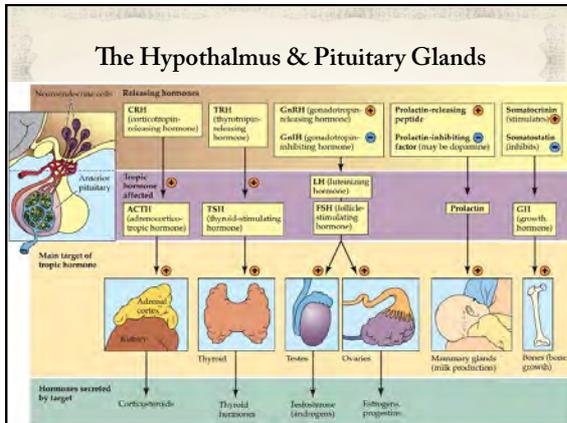


The hypothalamus in the brain releases hormones to drive the pituitary gland to secrete at least six different 'action' (tropic) hormones. Including:

LH/FSH > Testosterone (affects male fertility)
 LH/FSH > Estrogens (affects female fertility)
 Prolactin (controls breast milk production)
 GH (growth hormone)

TSH > Thyroid hormones T3 and T4

IN TURN:
 Thyroid hormones return to the hypothalamus, the pituitary gland and controls the speed of their metabolism.



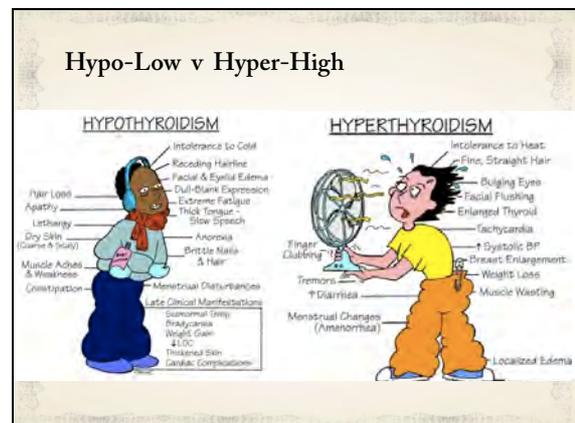
What is underactive thyroid?

Hypothyroidism is name of the condition when the thyroid gland does not produce enough thyroid hormones.

This causes the body’s metabolism to run too slowly and imbalances in your body’s functions start to occur.

- ### The reasons for underactive thyroid
- Insufficient iodine in your diet leads to not enough thyroid stimulating hormone (TSH) and thyroid hormones (T3, T4) being made. (Probably around 2/3 of cases.)
 - You might have an auto-immune disease such as *Hashimoto's thyroiditis*
 - You may have a damaged thyroid (e.g. after radiotherapy) or had your thyroid removed (an operation)

- ### The signs of underactive thyroid
- Classic early symptoms include:
- decreased energy
 - difficulty losing weight
 - dry skin
 - thinning hair
 - constipation
 - slow heart rate
 - feeling cold all the time
 - muscle aches and pains
 - forgetfulness and cognitive decline



What happens if not corrected?

If underactive thyroid is not treated, it can lead to serious problems.

- obesity
- goitre (de Benoist, McLean, Andersson & Rogers, 2008)
- low IQ; dementia (Bono & al., 2004)
- infertility, miscarriages (Arojoki et al., 2000)
- cardiovascular problems (Klein & Ojamaa, 2001)
- homeostatic imbalance (Warner & Mittag, 2012)
- melancholic depression (Davis & Tremont, 2007)
- diabetes (Chidakel, Mentuccia & Celi, 2005)
- mortality in high risk groups (e.g. dialysis patients)

WHO DOES IT AFFECT?

Babies and Children

For unborn babies, a lack of iodine in their mothers can lead to poor mental abilities.

Autism is four times more likely if the mother has a weakened thyroid gland while pregnant (Román et al., 2013).

Mild iodine deficiency in pregnancy can have long-term poor impact on a baby's cognitive development, not improved by supplementation (Hynes et al., 2013).

Mild iodine deficiency in pregnancy can have a irreversible impact on a child's educational success in the first 9 years of life (Hynes et al., 2013)

Babies and Children

49% babies are mildly iodine insufficient (Skeaff et al., 2005)

75% of pregnant women do not have enough iodine in their diet (Aubertot et al., 2013; Bath et al., 2013)

British researchers say that iodine deficiency in pregnant women in the UK should be treated as an important public health issue (Bath et al., 2013)

Children of mothers with an iodine status between 50 µg/g and 150 µg/g had a significantly increased risk of suboptimum outcomes for verbal IQ, and reading accuracy and comprehension. Minimum recommended intake: 250 µg/day

Teenagers and Young People

76% of British teenage school girls aged 14 test as iodine insufficient (Vanderpump et al., 2011)

52% of students aged 25 (Combetal., 2014)

This may often only show as mild fatigue, low energy, poor concentration or mild depression. Symptoms often dismissed as normal.

Teenagers and Young People

Most young people don't think about their thyroid. They often don't drink much milk, fish or seaweed. However, starving the thyroid of a vital mineral is storing up problems for the future.

Can affect **fertility** and the hormonal system
stress and the endocrine system
skin is improved with seaweed
brittle **hair** and nails

Women

66% of adult women affected
75% of pregnant women

Many women in their 40s feel exhausted.
Energy levels rise and plummet
Managing weight is a problem.
Hair becomes thin, skin becomes dry.
Peri-menopausal symptoms are confused.

Men

No statistics were found for men but
44% of men may be affected

(Australian Health Survey, 2013)

Ironically beer is a source of iodine!

Low thyroid is also linked to melancholic depression

(Davis & Tremont, 2007)

Older People

Underactive thyroid is so common in
older people that it is often not treated.

Low thyroid is linked to

feeling cold (homeostatic imbalance) (Warner & Mittag, 2012)

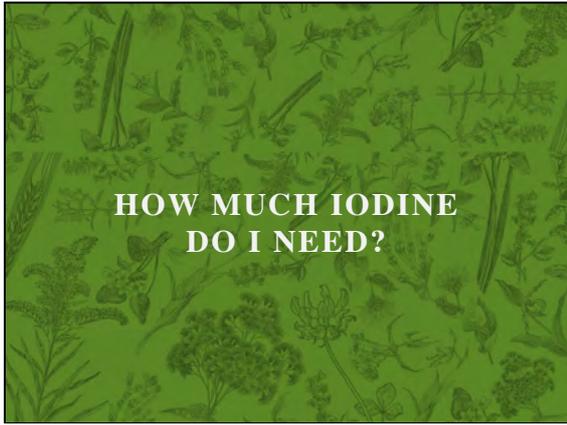
heart & cardiovascular problems

(Klein & Ojamaa, 2001)

dementia (Bono & al., 2004)

diabetes (Chidalel, Mennuccio & Celi, 2005)

It also increase mortality in high risk groups
(e.g. dialysis patients)



**HOW MUCH IODINE
DO I NEED?**

What is iodine?

Iodine is a mineral that the thyroid
combines with tyrosine (amino acid)
to create thyroid hormones.

A lack of T hormones can cause low energy, weight
gain, depression, muscle pain, coldness, constipation,

This can lead to underactive thyroid, heart disease,
cognitive decline and a variety of cancers. It is also
suspected to be related to the onset of diabetes.

Two billion people worldwide do
not have sufficient iodine intake
Did you know that the
World Health Organisation (WHO)
has declared that
**the UK has a *national* problem
of iodine deficiency?**

(de Benoit et al., 2007)

Prevention is better than cure!

Ensure that you have sufficient iodine in your diet to prevent your thyroid becoming undernourished and run down.

Iodine is not often found in the soil so not found in many vegetables.

It is chiefly found in the sea

Also found in milk, as it vital to the growth and healthy development of young animals



The daily dose

To get your daily iodine you need to eat one of the following **every single day**

- 2 to 3 eggs
- 1 ½ **whole** mackerel
- 3 **large** glasses **non-organic** milk
- ½ teaspoon powdered seaweed

Sources of Iodine



FISH
1 1/2 whole mackerel a day



EGGS
2 eggs per day



MILK
3 large glasses a day



FORTIFIED FOODS



SEAWEED
1 heaped teaspoon every 3 days



NAPIERS SEAGREENS
1 capsule per day

Sources of Tyrosine

Thyroid cells combine iodine and tyrosine to make T hormones

2050mg	Seaweed, raw
1782mg	Seaweed, dried
1620mg	Shellfish
1500mg	Chicken (up to)
1500mg	Pork (up to)
1484mg	Tuna
1483mg	Spinach (up to)
1263mg	Watercress, raw
1261mg	Sesame seeds
1195mg	Beef (up to)
1006mg	Beans
52mg	Oranges
4 mg	Apples



*in a 200 calorie serving

What is the recommended dose?

The recommended daily dose (RDA) in the UK is **140 mcg** a day

The average Japanese person consumes iodine in ranges averaging

1,000 to 3,000 mcg

and sometimes much higher with a host of health benefits

What is the safe upper limit?

WHO and UNICEF both recommend that pregnant women take a minimum of **250 mcg** of iodine a day (Azizi & Smyth, 2009)

Recommended safe upper limits per day

- UK Dept of Health (RDI) **1000 mcg**
- US Dept of Medicine **1100 mcg**
- World Health Organisation **1100 mcg**
- Japan Ministry of Health **3000 mcg**

Japanese Health Statistics

Due to high seaweed consumption iodine intake
(Zava & Zava, 2011)

- Average life expectancy: Japan 83 years v US 78 years
- Breast cancer mortality rate: Japan 3 times lower than US (1999)
- Breast cancer mortality rate: 50% increase for Japanese immigrants after 10 years in the USA (1999)
- Prostate cancer: Japan 10 times lower than US (2002)
- Heart related deaths: Japan 897 per 100k v US 1,415 per 100k
- Infant deaths: Japan 2.8 per 1,000 v US 6.8 per 1,000 (2004)

But I have a fairly good diet...

- The chances are that even if you have a good diet, unless you eat a lot of sea fish and seaweed, you will still be iodine deficient
- A Danish study found that women taking just iodised salt were not protected as well as those who took an iodine supplement (Andersen et al., 2013)
- Nor were they protected if they took a multivitamin with only 150mcg iodine in it ~ the current British recommended daily allowance (RDA) (Vandevijvere et al., 2013)
- Other chemicals near iodine in the periodic table, such as chlorine and fluorine, displace iodine
- Fluoride toothpaste and oral care products, and chlorinated water may interfere with iodine uptake

But I have a good diet...

Group-1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 H																	2 He
3 Li	4 Be								5 B	6 C	7 N	8 O	9 F	10 Ne			
11 Na	12 Mg								13 Al	14 Si	15 P	16 S	17 Cl	18 Ar			
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba		72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra		104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Uut	114 Fl	115 Uup	116 Lv	117 Uus	118 Uuo
Lanthanides		57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu	
Actinides		89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr	

F = Fluorine
Cl = Chlorine
Br = Bromine
I = Iodine

OUR RESEARCH

Our research with the University of Glasgow and the Seaweed Health Foundation (Cumbet 2014)

At the beginning of the study:

- 50 healthy volunteers, average age 25
- 52% found to be iodine insufficient
- This corresponded with low levels of TSH (*Thyroid Stimulating Hormone*)

Although they seemed healthy, their thyroids were malnourished and being deprived of iodine

Our Research (Cumbet 2014)

We wanted to test how seaweed and its iodine was absorbed by the body.

- We used Napiers Seagreens Organic Hebridean Kelp Capsules (*Ascophyllum nodosum*)
- Healthy volunteers took one capsule of Napiers Seagreens Organic Hebridean Kelp a day for a month
- One 500 mg capsule contains 350 mcg of chelated iodine
- We measured their urine, blood and iodine levels at intervals

Our research (Combet 2014)

By the end of the study period:

- the chelated iodine found in the kelp increased their urinary iodine at safe levels
- it corrected thyroid stimulating hormone (TSH) production back to normal levels
- the matrix structure of seaweed delayed the iodine absorption avoiding sharp peaks
- this matrix enabled a more sustained release of iodine over a 3 day period

They were now no longer malnourished!

Our Research

From this research we concluded that:

- sufficient iodine intake can prevent the development of hypothyroidism in some cases
- sufficient iodine intake can reverse symptoms of hypothyroidism
- the slow, stable release of chelated iodine found in seaweed is a safer form of iodine supplementation

Napiers supplementation

- One Napiers Seagreens Organic Hebridean Kelp capsule delivers 350 mcg of chelated iodine.
- You can take up to 3 capsules a day (equivalent to 1050 mcg iodine) and still be within the World Health Organisation safe upper limit of 1100 mcg.
- Remember, that seaweed iodine is far gentler than potassium iodide supplements.
- As 37% is excreted within 24 hours, three capsules will give an overall dosage after 24 hours of 662 mcg.
- This is why we have heard reports of people taking large doses, such as 6 capsules a day, and experiencing radical improvements to health conditions such as arthritis or skin problems without any ill effects.

IS IODINE SAFE?

Not all iodine is equal

Too much iodine can over stimulate the thyroid leading to an overactive thyroid.

However, different types of iodine behave differently in the body.

It is important to choose the right type of iodine and take the right amount.

Two types commonly available:

- Potassium iodide
- Chelated (natural) iodine

Potassium iodide

- Potassium iodide is absorbed by the body very quickly
- It is excreted again within three hours
- This can cause short, sharp iodine spikes in the body
- Potassium iodide in salt is not good as too much salt in your diet can lead to high blood pressure
- There are some concerns in countries with iodized salt programs that people in these areas are ending up with overactive thyroid or autoimmune disease (Teng et al., 2011).

Chelated iodine

- Chelated (natural) iodine is absorbed by the body slowly
- This does not create a spike
- It is excreted over a three day period.
- This creates a much more stable, steady supply of iodine for the thyroid (Combet, 2014)

TREATMENT OPTIONS FOR HYPOTHYROIDISM

Prevention is better than cure!

If your thyroid is borderline, or you have the symptoms and your tests are in the 'normal' range, you may find that increasing your consumption of iodine makes a big difference.



Levothyroxine *Levothyroxine sodium*

The most common treatment for hypothyroidism is levothyroxine sodium (L-Thyroxine). The Royal College of Physicians (2011) recommend this as the only treatment

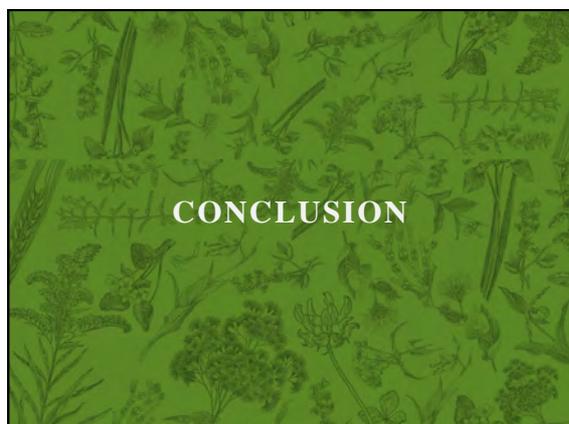
The Scale of the Problem

During 2006, 12 million prescriptions for levothyroxine were dispensed in England alone ~ equivalent to about 1.6 million people taking long term thyroid replacement therapy about 3% of the population (Waidya & Pearce, 2008)



Knotted kelp *Ascophyllum nodosum*

The most common prevention for hypothyroidism is dietary iodine supplementation through iodized salt. 500mg knotted kelp in Napiers Seagreens Hebridean Kelp capsule contains 350mcg chelated iodine



My Conclusion

1. A leading cause of underactive thyroid is a lack of iodine in the diet
2. Treating low levels of T4 hormone without addressing the underlying iodine insufficiency is nonsensical as taking levothyroxine does not restore a normal state in all tissues (Celi et al., 2011)
3. Knotted kelp corrects urinary iodine insufficiency and rebalances TSH levels (Combet, 2014)
4. Safe iodine supplementation is necessary for optimum thyroid baseline health
5. Levothyroxine drug treatment should be used once iodine intake is sufficient, if there is still a thyroid problem

The Big Question

If the nation had a calcium deficiency of this magnitude, affecting over half the population...

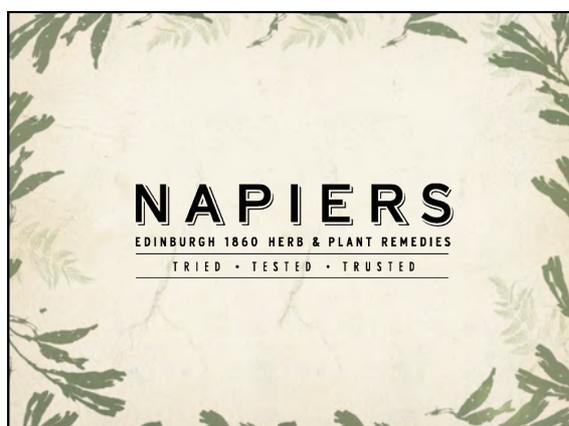
...would we be advising people to drink more milk and eat more dairy products...

...or would we keep quiet and let their health deteriorate until they needed medication?

The End

Any Questions?

Monica Wilde
Napiers the Herbalists



Nutrient profile of knotted kelp

Many 'man made' vitamins and minerals are not easily absorbed by the body. Seaweed is a whole, complete food that mankind has eaten since the dawn of time and perfectly suited to our bodies.

- **Vitamins:** A (antioxidant), B group (including B12, Thiamine, Riboflavin, Niacin, Pantothenic acid, Pyridoxin, Choline and Cobalamin), C (antioxidant), D (Cholecalciferol), E (antioxidant), H (Biotin) and K (Menadione).
- **Minerals:** Calcium, Magnesium, Nitrogen, Phosphorus, Potassium, Sodium, Sulphur.
- **Amino acids:** Histidine, Isoleucine, Leucine, Lysine, Methionine, Phenylalanine, Threonine, Tryptophan, Valine, Alanine, Arginine, Aspartic acid, Cysteine, Glutamic acid, Glycine, Proline, Serine, Tyrosine.
- **Trace elements:** Antimony, Boron, Cobalt, Copper, Fluorine, Germanium, Gold, Iodine, Iridium, Iron, Lithium, Manganese, Molybdenum, Platinum, Rubidium, Selenium, Silicon, Silver, Tellurium, Titanium, Vanadium and Zinc.

Notes on iodine supplementation:

Benefits

- sufficient iodine intake can prevent the development of hypothyroidism
- sufficient iodine intake can reverse symptoms of hypothyroidism
- chelated iodine found in knotted kelp increases urinary iodine at safe levels and corrects thyroid stimulating hormone (TSH) production (Combet, 2014)
- the seaweed matrix delays iodine absorption, enabling a more sustained release (Combet, 2014)

Notes on iodine supplementation:

Potential side effects

- Hyperthyroidism: Excess iodine intake can lead to an overactive thyroid
- Thyroid autoimmune disease: Excess iodine intake can trigger Hashimoto's thyroiditis in genetically predisposed individuals

However...

- There are two main types of iodine. Potassium iodide (found in salt and supplements like Iodoral) and chelated iodine found naturally in seaweeds like kelps and wracks.

Which iodine is better?

- I recommend chelated iodine because it is more consistent, stable and safer in the body
- It avoids the spikes associated with iodide supplements.
- And potassium iodide in salt is not good as too much salt in your diet can lead to high blood pressure.

Napiers Seagreens Organic Hebridean Kelp Capsules contain a Soil Association certified organic, low temperature dried seaweed called *Ascophyllum nodosum*. Organic is important here because the sea can sometimes be a source of pollution from sewage or heavy metals. It also ensures that the seaweed is sustainably harvested and no damage done to the seabed or to marine life.

ALREADY ON MEDICATION?

Can kelp be taken concomitantly?

A single case study

A patient taking 175 mcg of levothyroxine with no change in 15 years, started to take a single 500mg capsule of Seagreens® *Ascophyllum nodosum* daily. After one month, his TSH serum levels showed that he needed a reduction of 50mcg of levothyroxine to 125mcg. Over a further twelve months, on one capsule a day, TSH serum levels remained stable and the patient remained on the lower thyroxin dose. There have been no studies on this subject.

Why correct iodine sufficiency?

To restore healthy thyroid function

When iodine insufficiency is corrected the thyroid gland needs less or no medication
Current synthetic thyroxin treatment alleviates the symptoms but does not address the cause

To reduce the side effects of levothyroxine

Many hypothyroid subjects receiving levothyroxine complain of psychological symptoms or cognitive dysfunction. (Samuels et al, 2007)

Levothyroxine: Benefits

- Replaces T4 for the thyroid to convert to T3
- Reverses many hypothyroid symptoms
- Is fairly well tolerated in the population

Levothyroxine: Potential side effects declared on PIL

- Allergic reactions: including a rash which may be itchy or swelling.
- Heart: a racing heart, irregular heart beats, palpitations, anginal pain.
- Central nervous system: headache, restlessness, excitability, difficulty in sleeping, flushing, sweating, fever, involuntary shakiness, heat intolerance.
- Stomach and intestines: diarrhoea, being sick, excessive weight loss.
- Muscle and bone: muscle cramps, muscular weakness.
- Other: partial hair loss during first few months of therapy.

Levothyroxine: Side effects experienced by patients (Mayo Clinic, 2012)

LESS COMMON		RARE
Chest pain or discomfort	Irregular breathing	Blurred or double vision
Decreased urine output	Irritability	Dizziness
Difficult or labored breathing	Menstrual changes	Eye pain
Difficulty with swallowing	Nausea	Lack or slowing of normal growth in children
Dilated neck veins	Pain or discomfort in the arms, jaw, back, or neck	Limp or walk favoring one leg
Extreme fatigue	Shortness of breath	Pain in the hip or knee
Fainting	Skin itching, rash, or redness	Seizures
Fast, slow, irregular, pounding, or racing heartbeat or pulse	Sweating	Severe headache
Fever	Swelling of the eyes, face, lips, throat, or tongue	
Heat intolerance	Tightness in the chest	
Hives or welts	Tremors	
Increased blood pressure	Troubled breathing	
Increased pulse		