



NOUYAN

Nouyan negin parsian Co., PJS

هدف ما، ارتقاء فناوری صنعت آزمایشگاهی کشور



لطفأ
اسکن
کنید

Our vision
intelligence of the country's lab industry



تهران، پلوار آیت الله کاشانی، خیابان گلستان
شمالی، کوچه نسترن شرقی، پلاک ۴۶
ساختمان نویان نگین پارسیان

www.nouyan-co.com

NOUYAN_NEGIN_PARSIAN

۰۲۱.۴۹۳۷۵۰۰۰ (خط ویژه)

Products	Thyroid Panel	T3 (96)	Tumor Markers	*PSA (96)	
		T3 (192)		*Free PSA (96)	
		T4 (96)		*CEA (96)	
		T4 (192)		*AFP (96)	
		*TSH (96)		*CA 125 (96)	
		*TSH (192)		*CA 19-9 (96)	
		Free T3 (96)		*CA 15-3 (96)	
		Free T4 (96)		Steroids Panel	*DHEA-S (96)
		T-uptake (96)			*17OH-Progesterone (96)
		*Anti-TPO			*(E2) Estradiol (96)
	Infectious Diseases	*Anti-H.pylori-IgA (96)	*Testosterone (96)		
		*Anti-H.pylori-IgM (96)	*Progesterone (96)		
		*Anti-H.pylori-IgG (96)	*Cortisol (96)		
	Rheumatology	ANA (96)	*Free Testosterone		
		Anti-ds DNA (96)	Vitamin D		25-Hydroxy Vitamin D (96)
		CCP (96)			25-Hydroxy Vitamin D (192)
	Anemia	*Ferritin (96)	Allergy		*IgE (96)
		*Ferritin (192)	SARS-COV-2	SARS-COV-2_IgG	
		*Vitamin B12 (96)		SARS-COV-2_IgM Capture (96)	
		*Folate (96)		SARS-COV-2_Antigen Rapid	

تکنولوژی پلیت استریتو اویدین-بیوتین *

Growth Hormone	*hGH (96)	Products
ParaThyroid Hormone	*PTH (96)	
Fertility Panel	*LH (96)	
	*FSH (96)	
	*PRL (96)	
	*βHCG Titr (96)	
	βHCG (96) Rapid	
	βHCG (192) Rapid	
	AMH (96)	

NEW Kits

Rheumatology	ANA (96)	*تکنولوژی پلیت استریتو اویدین-بیوتین
	Anti-ds DNA (96)	
	CCP (96)	
Tumor Markers	*CA 125	
	*CA 19-9	
	*CA 15-3	
Fertility	AMH	
Anemia	Folate	
Miscellaneous	PTH	



ژال تجهیز

JAL TAJHIZ MEHRAN
LAB EQUIPMENT DESIGN & PRODUCTION



JAL TAJHIZ MEHRAN
WWW.JALTAJHIZCO.COM
(دانش بنیان)

(طراحی - مشاوره - اجرا و ساخت تجهیزات آزمایشگاهی و تحقیقاتی)
با مجوز از وزارت بهداشت درمان و آموزش پزشکی و وزارت صنایع و معادن استان تهران

Hipro[®]

Hipro Biotechnology Co., Ltd

HP083/4-II

- 4 individual test channels
- Rapid whole blood test
- Simple, Rapid, Accurate
- Portable near to patient

Hurricane[®]

POCT Immunoassay System



Magnus[®]

microscopes

MX21i

CLINICAL MICROSCOPE



- Anti fungus optics
- Plan superior imaging
- Rackless stage for durability and ease of use
- Ergonomic and compact design for user convenience
- Aspheric light relay system for bright and uniform illumination

Optional Accessories



Dual Filter (B&O)



Trinocular Head With USB Digital Camera

شرکت بنیان درمان

Lifotronic

GeneStar-96 Real-Time PCR System

- Compact & High throughput
- High efficiency
- Reliable
- High flexibility



شرکت بنیان درمان
تلفن: ۸۸۷۰۳۰۵۰ (خط ۱۰)

Advantages of Electro-chemiluminescence Immunoassay

- Controllable Optical Signal
- High Sensitivity and Precision
- Magnitude of Luminescent Intensity Reaches Six Orders
- Compatible with Small Sample Volume
- High Stability for Reagent
- One of The ECLIA System in the World



شرکت بنیان درمان
تلفن: ۸۸۷۰۳۰۵۰ (خط ۱۰)

eCL8000

Electro-chemiluminescence Immunoassay (ECLIA) System

Lifotronic



ردیف	تاریخ	نحوه برگزاری	مبحث	نام استاد	امتیاز بازآموزی
۱	۱۴۰۱/۱۰/۰۲	آنلاین - حضوری	سل کانترهای پیشرفته	دکتر نادر وظیفه شیران	✓
۲	۱۴۰۱/۱۰/۰۶	آنلاین - حضوری	مدیریت ریسک و مدیریت هزینه	دکتر مهرداد ونکی	✓
۳	۱۴۰۱/۱۰/۱۵	آنلاین - حضوری	تیروئید شناسی	دکتر محمدرضا بختیاری	✓
۴	۱۴۰۱/۱۰/۱۶	آنلاین - حضوری	تیروئید شناسی	دکتر محمدرضا بختیاری	✓
۵	۱۴۰۱/۱۰/۲۲	آنلاین - حضوری	تیروئید شناسی	دکتر محمدرضا بختیاری	✓
۶	۱۴۰۱/۱۰/۲۳	آنلاین - حضوری	تیروئید شناسی	دکتر محمدرضا بختیاری	✓
۷	۱۴۰۱/۱۰/۲۹	آنلاین	کنترل کیفیت در آزمایش تعیین حساسیت ضد میکروبی (آنتی بیوگرام)	دکتر سید مهدی بوتراپی	✓
۸	۱۴۰۱/۱۱/۰۶	آنلاین	ایمونوپاتولوژی انواع هپاتیت های ویروسی و اتوایمون	دکتر بابک بلبلی	✓
۹	۱۴۰۱/۱۱/۰۷	آنلاین	اصول تفسیر و چالشهای آزمایشگاهی انواع هپاتیت ویروسی	دکتر بابک بلبلی	✓
۱۰	۱۴۰۱/۱۱/۰۸	آنلاین	کنترلی کیفیت ابزار پایه در بخش میکروب شناسی	سرکار خانم صبوریان	✓
۱۱	۱۴۰۱/۱۱/۰۹	آنلاین	کنترل کیفیت در بخش میکروب شناسی	سرکار خانم صبوریان	✓
۱۲	۱۴۰۱/۱۱/۱۱	آنلاین - حضوری	اصول مشتری مداری	مهندس بابکی	✗
۱۳	۱۴۰۱/۱۱/۱۲	آنلاین - حضوری	اصول مشتری مداری	مهندس بابکی	✗
۱۴	۱۴۰۱/۱۲/۰۴	آنلاین	جنبه های آزمایشگاهی هورمون رشد و پرولاکتین	دکتر رضا محمدی	✓
۱۵	۱۴۰۱/۱۲/۰۵	آنلاین	جنبه های آزمایشگاهی غدد فوق کلیوی	دکتر رضا محمدی	✓
۱۶	۱۴۰۱/۱۲/۱۱	آنلاین	جنبه های آزمایشگاهی غدد تیروئید	دکتر رضا محمدی	✓
۱۷	۱۴۰۱/۱۲/۱۲	آنلاین	جنبه های آزمایشگاهی غدد جنسی	دکتر رضا محمدی	✓

دیپارتمان آموزش و پژوهش

انجمن علمی دکترای علوم آزمایشگاهی

Education and Research
Department of DCLS
Association of Iran

تشخیص پزشکی ایران



انجمن علمی دکترای علوم آزمایشگاهی
تشخیص پزشکی ایران



• Tumor Markers

• Thyroid

• Growth Hormone

• Fertility



• Steroids

• Anemia

• Allergy

• Rheumatology

• Vitamin D

• Infectious Diseases

NEW KITS

ANA
AMH

ds DNA
Folate

CCP
PTH

CA 125
CA15-3

CA19-9

idealdiag.com



هدف ما، ارتقاء فناوری صنعت آزمایشگاهی کشور



Intelligence of the country's lab industry

Hipro®

Hipro Biotechnology Co., Ltd

- 4 individual test channels
- Rapid whole blood test
- Simple, Rapid, Accurate
- 3-level Calibration System
- Assure reliable and accurate results
- Multi-methodologies



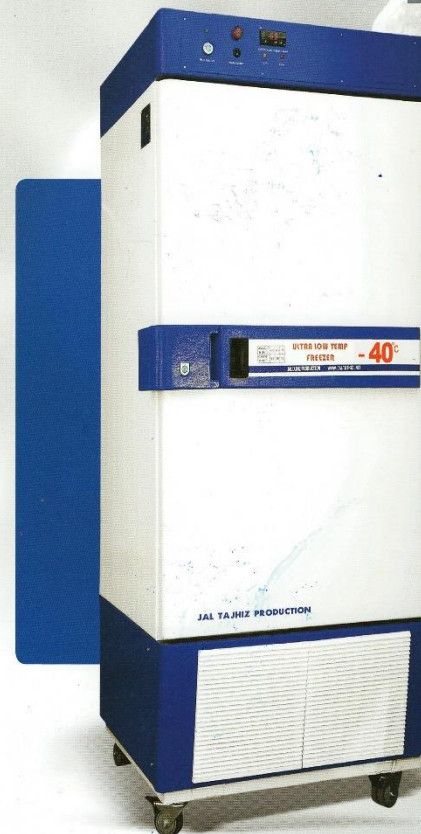
Hurricane

POCT Immunoassay System

شرکت بنیان دروهان
تلفن: ۰۲۰-۸۸۷۰۳۰۵۰ (خط ۱۰)

Jal Tajhiz co., Ltd

LAB EQUIPMENT DESIGN & PRODUCTION



FREEZER - 40°C
UPRIGHT



MODEL	JTFUL130	JTFUL280	JTFUL360
Capacity	130 L	280 L	360 L
External dimensions	150*55*70 cm	177*72*80 cm	200*72*80 cm
Internal dimensions	75*35*55 cm	96*52*55 cm	125*52*55 cm
Shelves	3	4	5

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

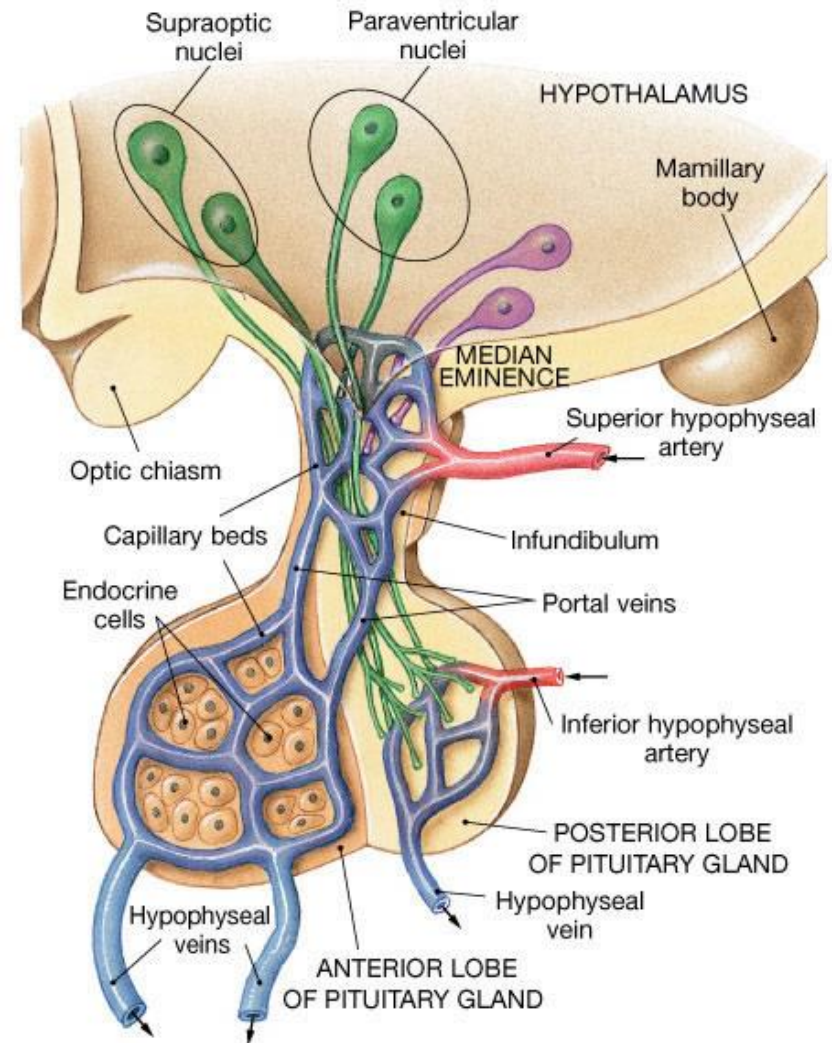
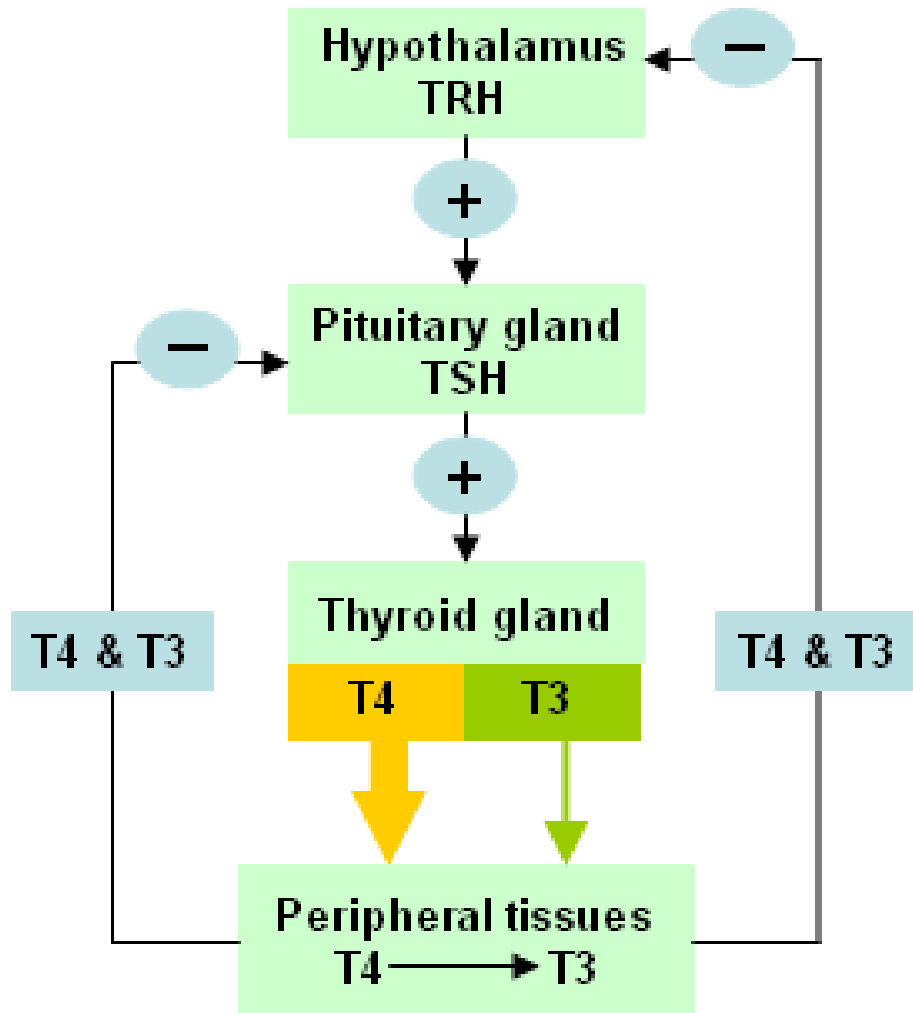
Hypothyroidism

M Reza Bakhtiari, DCLS, PhD



dr.bakhtiari.academy

Hypothalamus-Pituitary-Thyroid (HPT) Axis



What is Hypothyroidism?

Definition:

- Hypothyroidism is traditionally defined as deficient thyroidal production of thyroid hormone.
- Hypothyroidism can be defined by
 - a decrease in thyroid hormone production and/or
 - by an impaired action of thyroid hormones on target tissues.

Classification:

- **Primary Hypo.**
- **Central Hypo.**
 - Secondary H.
 - Tertiary H.
- **Peripheral (extrathyroidal) Hypo.**

Etiology





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Hurricane
POCT Immunoassay System



HP083/4-II

- 4 individual test channels
- Rapid whole blood test
- Simple, Rapid, Accurate
- Portable near to patient

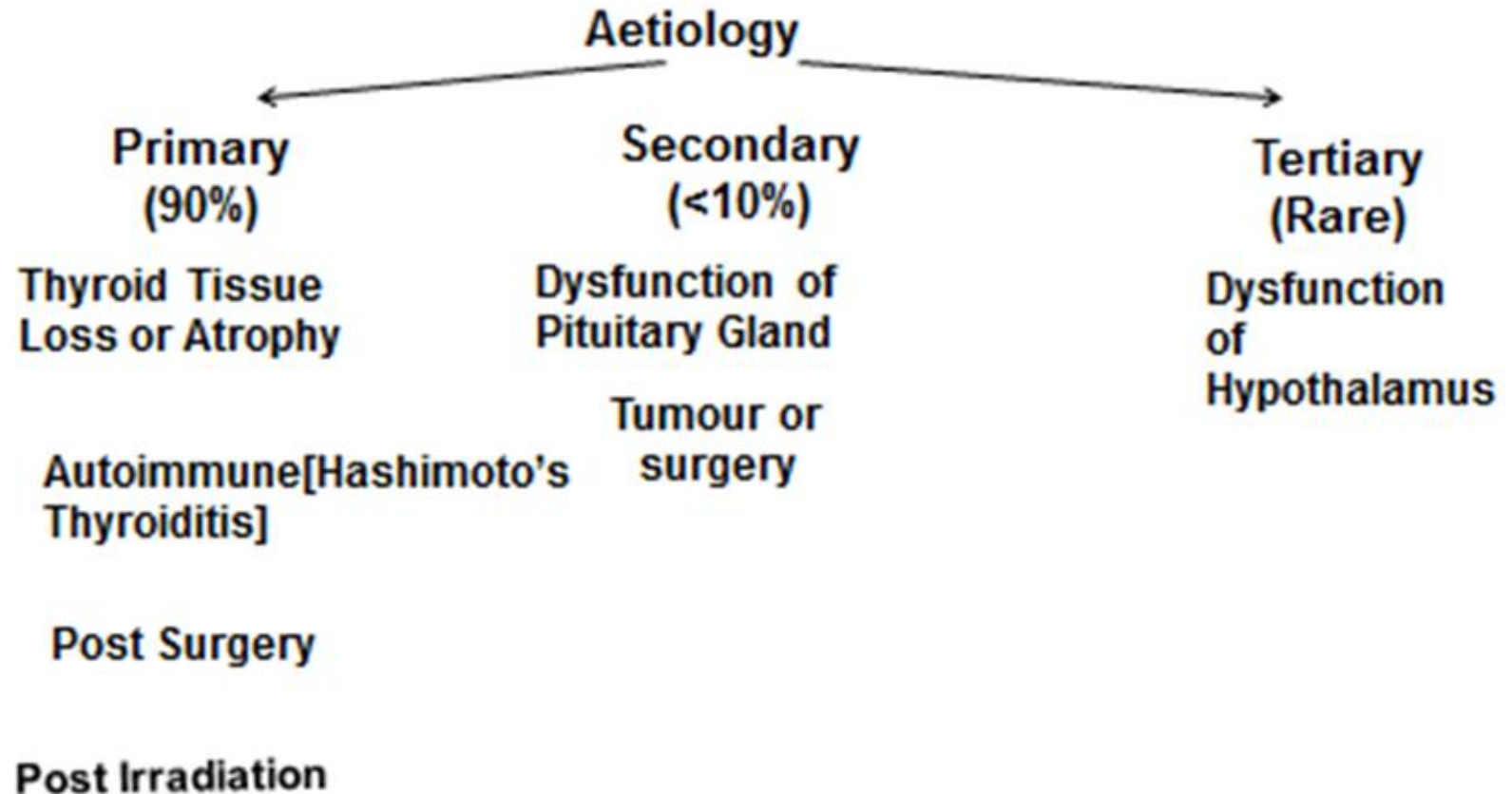
					
Products	Thyroid Panel	Tumor Markers	CA125- E	Vitamin D	25-Hydroxy Vitamin D (25-OH-D3)
			CA19-9	Albengu	Albumin
			CA226		CRP
			CA72-4	Fertility Panel	FSH
			CEA		Progesterone
	Infectious Diseases	Steroid Panel	HBsAg		HBsAb
			HBeAg		HBcAb
			HBeAb		HBsAg
			Anti-HBc		Anti-HBc
			Anti-HBc IgG		Anti-HBc IgG
Anemia	Rheumatology	Anti-CCP		Anti-CCP	
		Anti-AMA		Anti-AMA	
		Anti-MMP		Anti-MMP	
		Anti-ANCA		Anti-ANCA	
		Anti-ANCA IgG		Anti-ANCA IgG	
Vasculitis	Thrombosis	Anti-ANCA IgA		Anti-ANCA IgA	
		Anti-ANCA IgG		Anti-ANCA IgG	
		Anti-ANCA IgM		Anti-ANCA IgM	
		Anti-ANCA IgE		Anti-ANCA IgE	
		Anti-ANCA IgG		Anti-ANCA IgG	
Coagulation	Calculation	Anti-Fibrinogen		Anti-Fibrinogen	
		Anti-Fibrinogen IgG		Anti-Fibrinogen IgG	
		Anti-Fibrinogen IgA		Anti-Fibrinogen IgA	
		Anti-Fibrinogen IgM		Anti-Fibrinogen IgM	
		Anti-Fibrinogen IgE		Anti-Fibrinogen IgE	



شبكة تشخیص ایران

پشتیبانی رایگان 24 ساعته

Etiology of Hypothyroidism



Causes of Hypothyroidism

Primary Hypothyroidism

Acquired

Hashimoto thyroiditis

Iodine deficiency (endemic goiter)

Drugs blocking synthesis or release of T₄ (e.g., lithium, ethionamide, sulfonamides, iodide)

Goitrogens in foodstuffs or as endemic substances or pollutants

Cytokines (interferon- α , interleukin 2)

Thyroid infiltration (amyloidosis, hemochromatosis, sarcoidosis, Riedel struma, cystinosis, scleroderma)

Postablative thyroiditis due to ¹³¹I, surgery, or therapeutic irradiation for nonthyroidal malignancy

Congenital

Iodide transport or utilization defect (NIS or pendrin mutations)

Iodotyrosine dehalogenase deficiency

Organification disorders (TPO deficiency or dysfunction)

Defects in thyroglobulin synthesis or processing

Thyroid agenesis or dysplasia

TSH receptor* defects

Thyroidal G_s protein abnormalities (pseudohypoparathyroidism type 1a)

Idiopathic TSH unresponsiveness

Transient (Post-thyroiditis) Hypothyroidism

Following painless (including postpartum thyroiditis) or painful subacute thyroiditis

William's Endocrinology, 2016

Causes of Hypothyroidism (Cont.)

Consumptive Hypothyroidism

Rapid destruction of thyroid hormone due to D3 expression in large hemangiomas or hemangioendotheliomas

Defects of Thyroxine to Triiodothyronine Conversion

Selenocysteine insertion sequence-binding protein 2 (SECISBP-2) defect

Drug-Induced Thyroid Destruction

Tyrosine kinase inhibitor (sunitinib)

Central Hypothyroidism

Acquired

Pituitary origin (secondary)

Hypothalamic disorders (tertiary)

Bexarotene (retinoid X receptor agonist)

Dopamine or severe illness

Congenital

TSH deficiency or structural abnormality

TSH receptor defect

Resistance to Thyroid Hormone

Generalized

"Pituitary" dominant

William's Endocrinology, 2016

Risk Factors for Hypothyroidism

History

- Age >60 years

- Hyperthyroidism

- Other autoimmune disease

 - Addison's disease

 - Pernicious anemia

 - Diabetes mellitus (type 1)

- Subacute thyroiditis (overt or silent)

- Head/neck cancer (treated)

- Family member with thyroid disease

Medication use

- Lithium carbonate

- Amiodarone

- Iodine (any form)

Routine tests (if previously done)

- Hypercholesterolemia

Thyroid tests (if previously done)

- Slightly raised serum TSH concentration

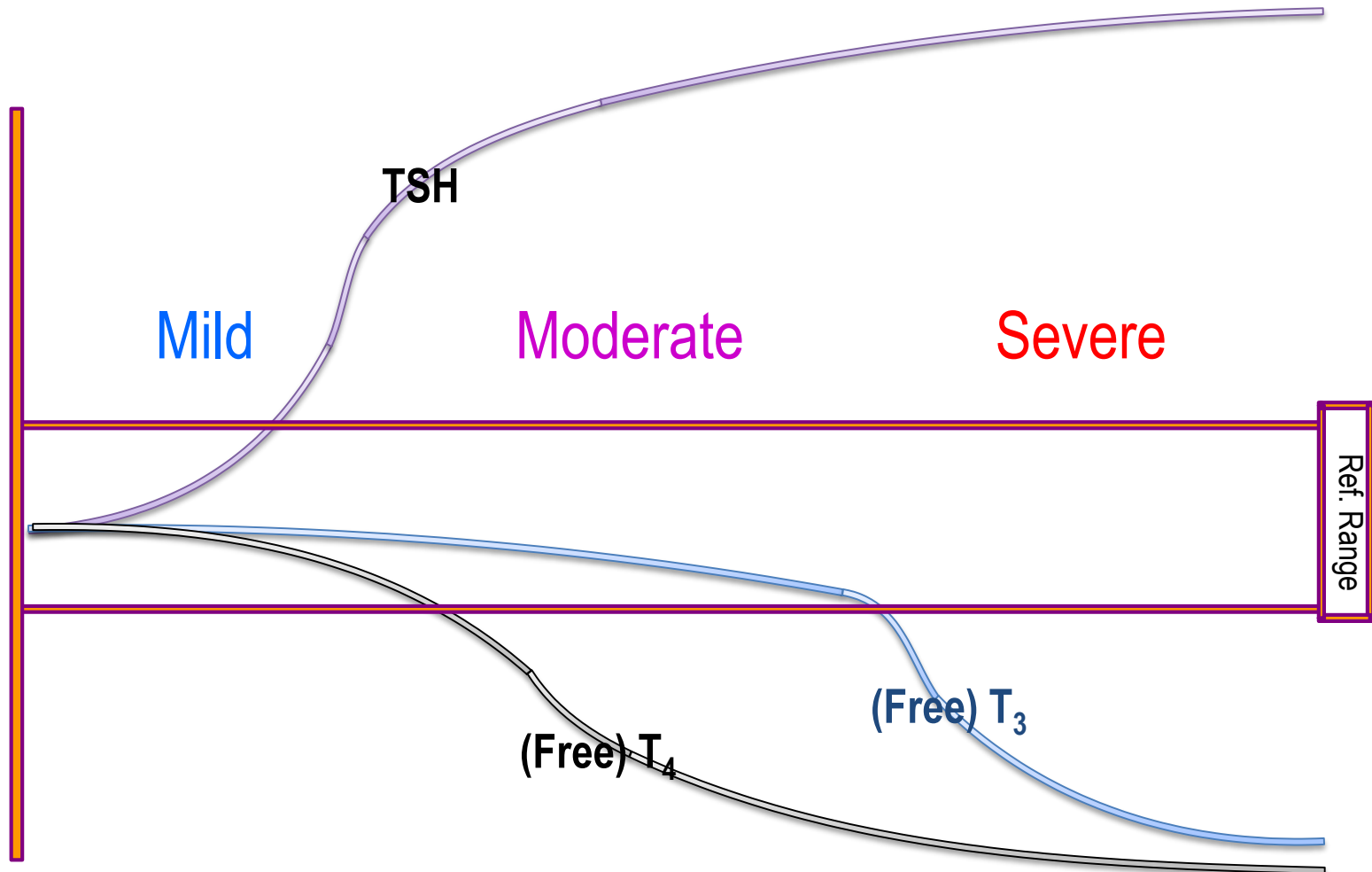
- Abnormal anti-TPO antibodies

Grades of Hypothyroidism

Grade 1	Subclinical hypothyroidism	TSH +	FT4 N	T3 N(+)
Grade 2	Mild hypothyroidism	TSH +	FT4 -	T3 N
Grade 3	Overt hypothyroidism	TSH +	FT4 -	T3 -

+, above upper normal limit; N, within normal reference range; -, below lower normal limit.

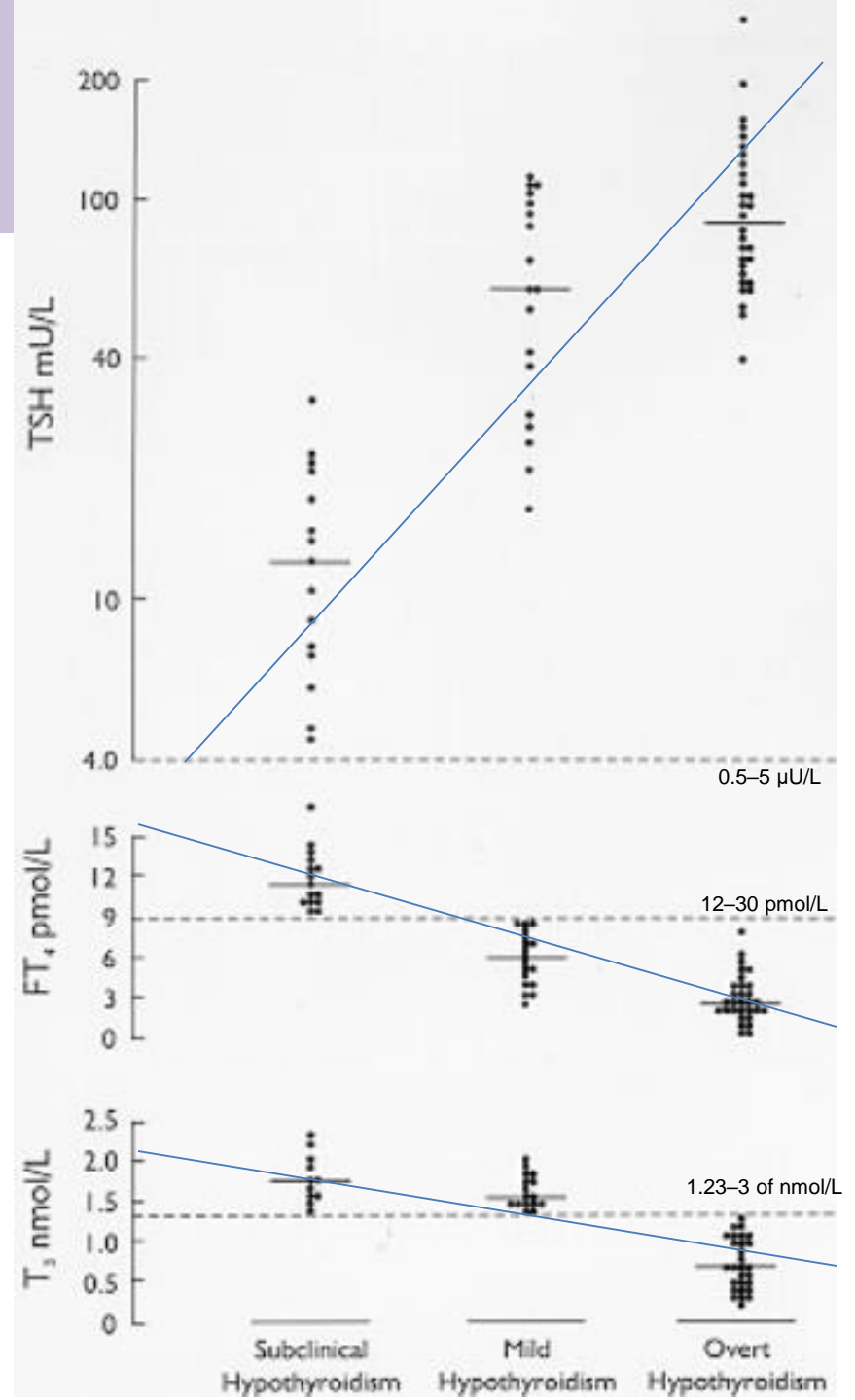
TFTs in Progressive Hypothyroidism



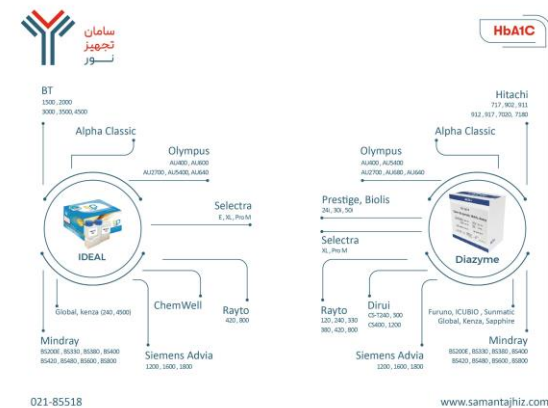
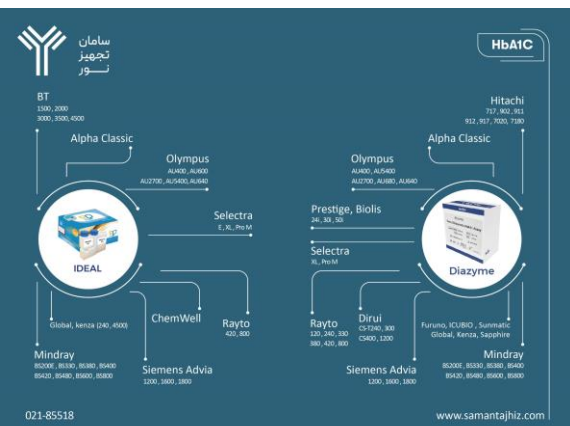
Grades of Primary Hypothyroidism

Individual and median values of thyroid function tests in patients with various grades of hypothyroidism.

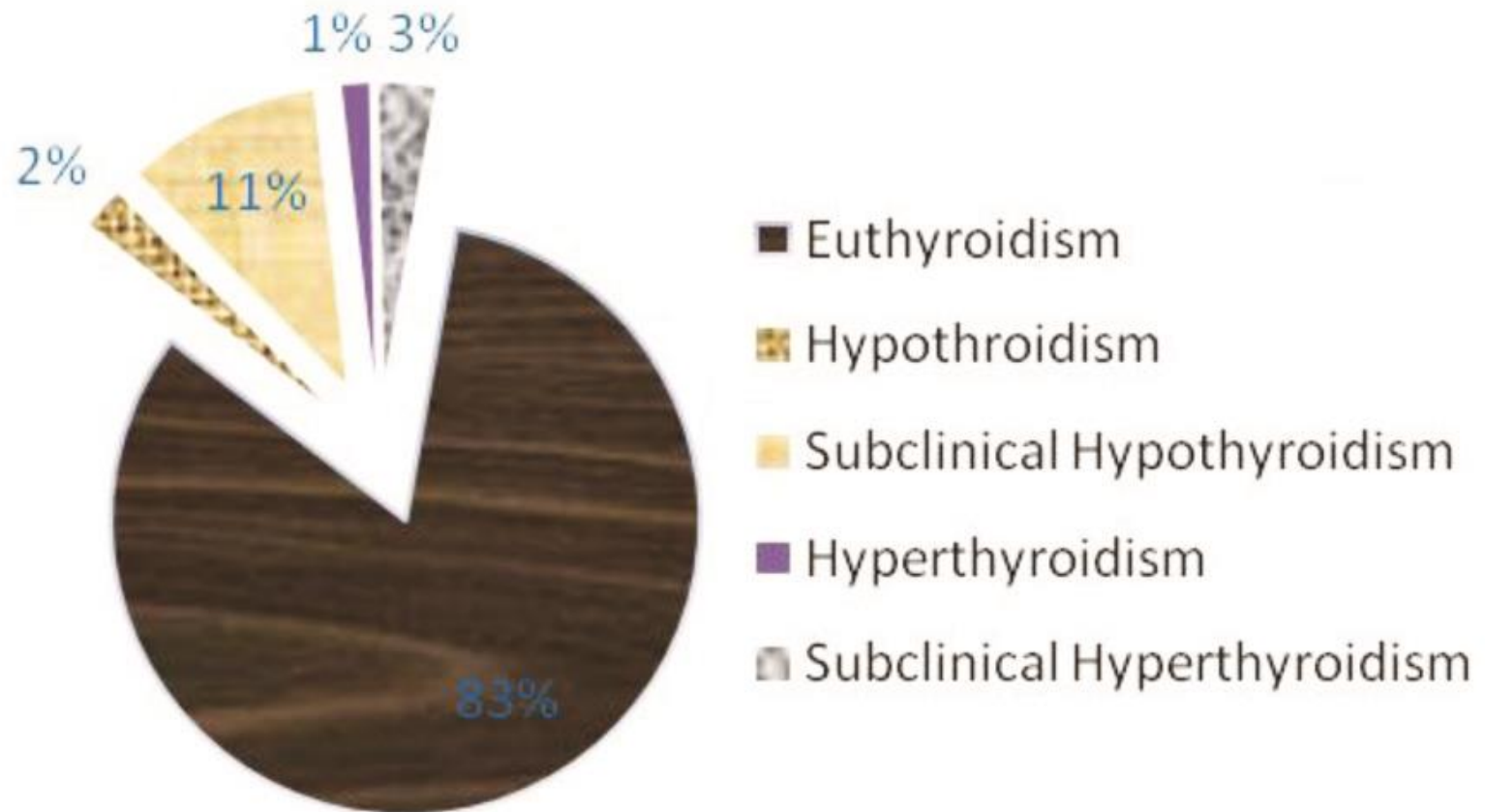
(Wiersinga, 2010).



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Prevalence of Thyroid Disorders



Epidemiology of anti-thyroid Ab+ hypothyroidism in the Whickham survey (#2779 adults for 20 years)

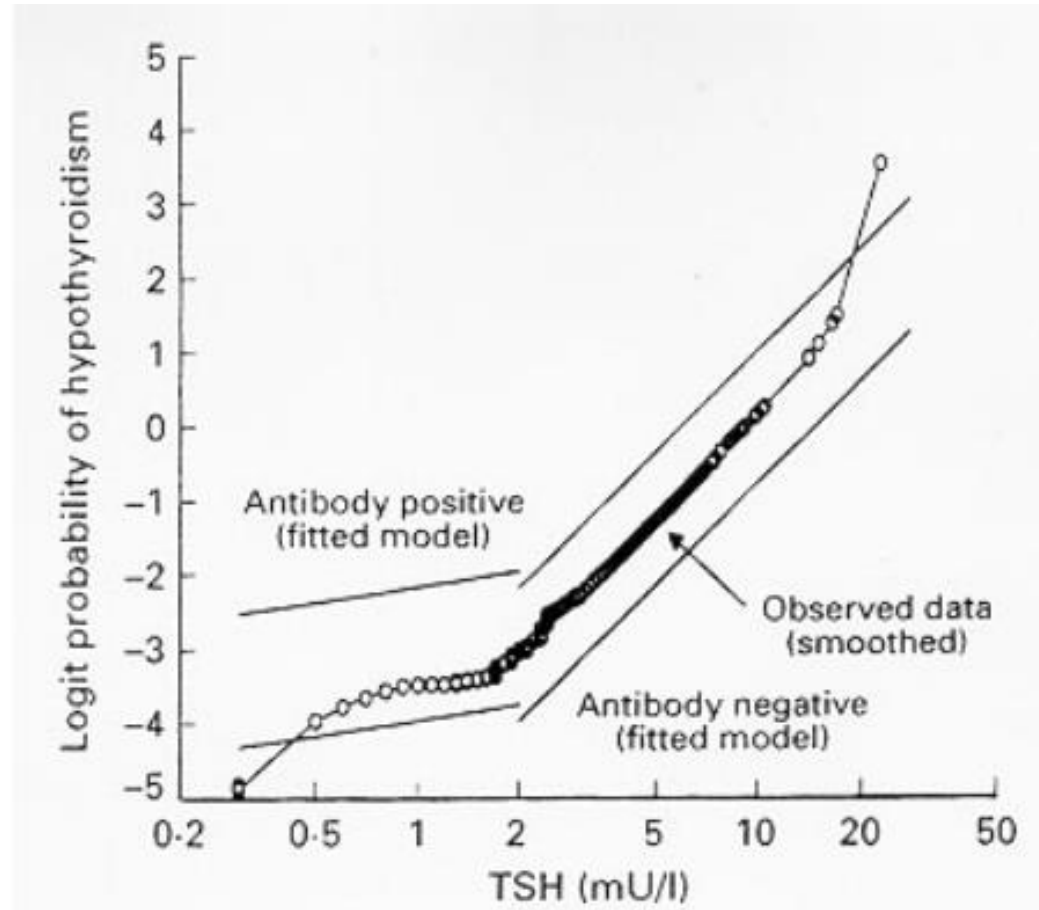
		Women %	Men %	Ratio
Prevalence	Tg antibodies	3	0.9	3.3
	TPO antibodies	10.3	2.7	3.8
	Subclinical hypothyroidism	7.5	2.8	2.7
	Hypothyroidism	1.8	0.1	18
Incidence	Hypothyroidism	0.41/y	0.06/y	6.8

• Tunbridge WMG, Evered DC, Hall R, et al.: The spectrum of thyroid disease in the community: the Whickham Survey. *Clin Endocrinol* 1977; 7: 481-493.

• Vanderpump MPJ, Tunbridge WMG, French JM, et al.: The incidence of thyroid disorders in the community: a twenty-year follow-up of the Whickham Survey. *Clin Endocrinol* 1995; 43: 55-68.

Development of hypothyroidism as a function of TSH values

(a 20-year follow-up of 912 women in the Whickham study)



Logit probability (log odds) for the development of hypothyroidism as a function of TSH values at first survey during a 20-year follow-up of 912 women in the Whickham

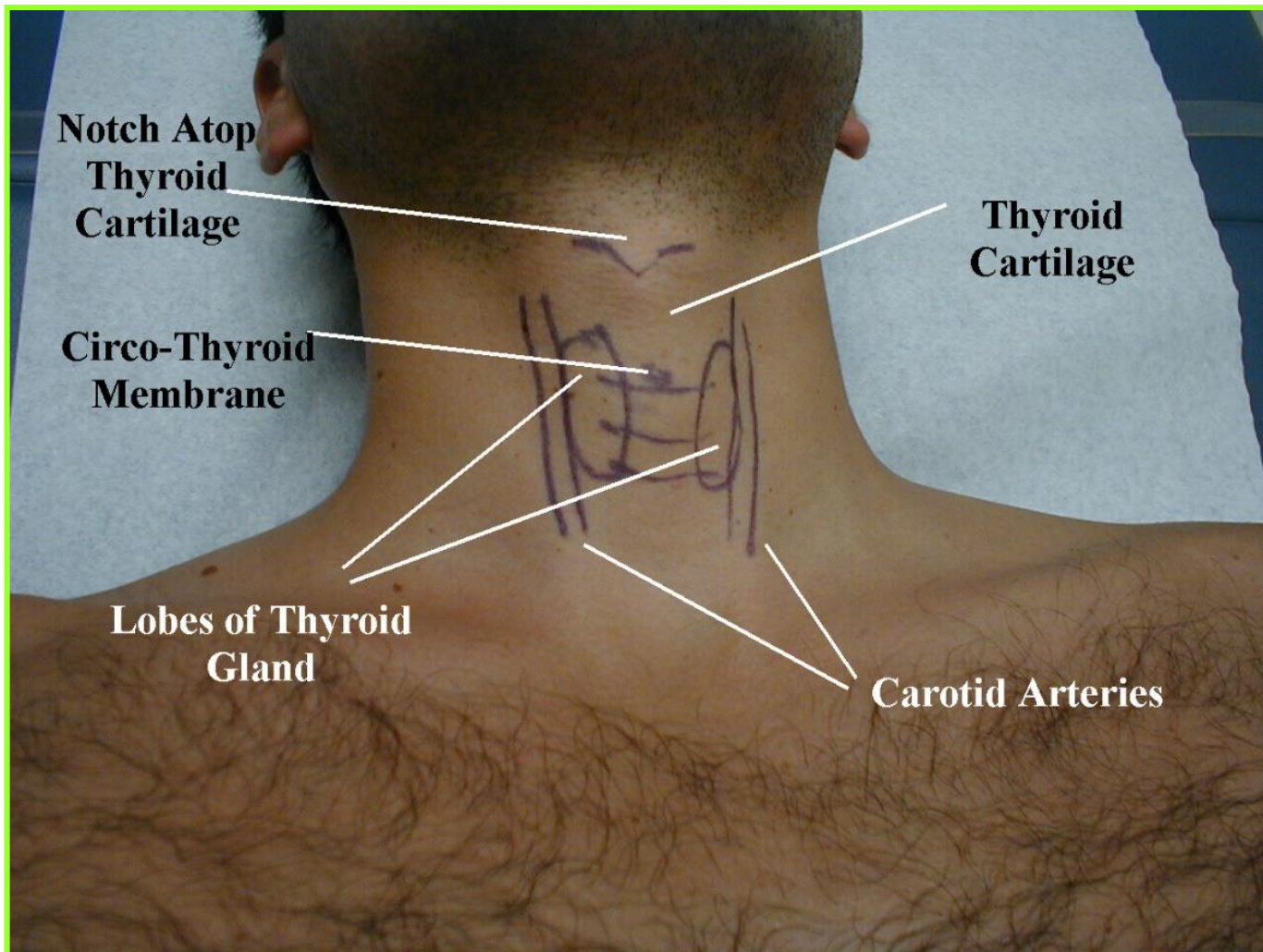
<http://www.thyroidmanager.org/chapter/adult-hypothyroidism/>

Prevalence of Hypothyroidism in Patients with Dyslipidemia: Tehran Thyroid Study (TTS) (Endocrine Care, 2014, F. Azizi et.al.)

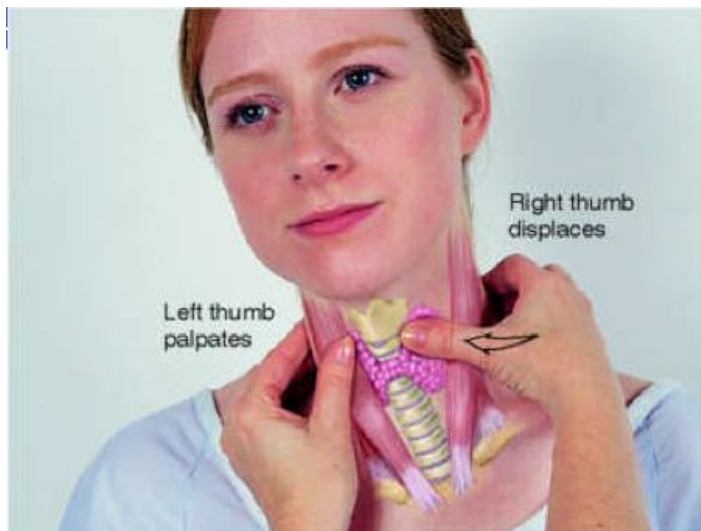
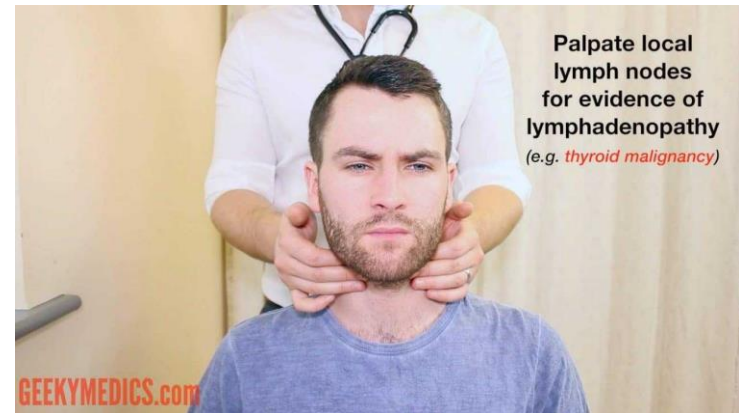
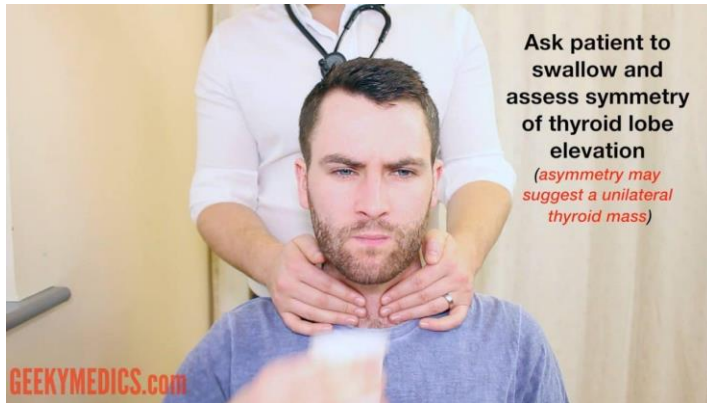
Variables	Total (n=4 794)	With dyslipidemia (n=2315)	Without dyslipidemia (n=2 445)
Age (years)	38.4±13.8	38.1±13.2 **	37.2±14.2
Gender			
Men	2 010 (41.9)	694 (30) **	1 191 (48.8)
Women	2 784 (58.1)	1 621 (70) **	1 254 (51.2)
TC (mg/dl)	197.9±43.1	204.1±48.4 **	191.3±35.6
TG (mg/dl)	127 (87–185)	130 (90–192) **	123 (85–178)
HDL-C (mg/dl)	41.9±11.0	41.3±9.1 **	42.6±12.5
LDL-C (mg/dl)	126.6±35.9	132.8±38.9 **	120.8±31.6
TSH (mU/l)	1.7 (1.1–2.8)	1.9 (1.2–3.2) **	1.5 (1.0–2.4)
FT4 (ng/dl)	1.2±0.2	1.1±0.2 **	1.2±0.2
TPOAb (+) * (mU/l), n (%)	602 (12.6)	348 (15.0) **	252 (10.3)
Thyroid status			
Euthyroid, n (%)	4 429 (92.4)	2 083 (90.0) **	2 315 (94.7)
Overt hypothyroidism, n (%)	99 (2.1)	69 (3.0) **	29 (1.2)
Subclinical hypothyroidism, n (%)	266 (5.5)	163 (7.0) **	101 (4.1)

All values represent mean±SD except for TSH and TG that are shown in median and IQR

Clinical Anatomy of Thyroid



Clinical Exam of Thyroid



Clinical Exam of Thyroid

(Finger Tips)



Clinical Manifestations of Hypothyroidism

Due to:

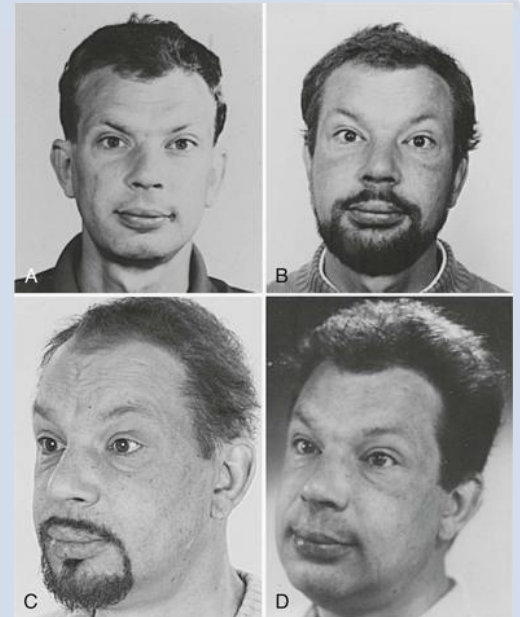
1. Decreased Metabolic Rate
2. Matrix Protein Accumulation
3. Other Manifestations

Clinical Manifestations of Hypothyroidism

Decreased
Metabolic Rate

• SYMPTOMS & SIGNS

- Fatigue and weakness
- Cold intolerance
- Dyspnea on exertion
- Weight gain
- Cognitive dysfunction
- Mental retardation (infant)
- Constipation
- Growth failure
- Bradycardia
- Delayed Speech
- Delayed relaxation of tendon reflexes



Clinical Manifestations of Hypothyroidism

Matrix Protein Accumulation

- **SYMPTOMS & SIGNS**
- Dry skin
- Hoarseness
- Edema
- Coarse skin
- Puffy facies and loss of eyebrows
- Periorbital edema
- Enlargement of the tongue



Clinical Manifestations of Hypothyroidism

Other Manifestations

- Decreased hearing
- Myalgia and paresthesia
- Depression
- Menorrhagia
- Arthralgia
- Pubertal delay
- Diastolic hypertension
- Pleural and pericardial effusions
- Ascites
- Galactorrhea



Automated
Immunoassay System



Electro-chemiluminescence
Immunoassay (ECLIA) System



Magnüs

Clinical & Research
Microscopes



Multi system effects - Hypothyroidism

General

- Lethargy, Somnolence
- Weight gain, Goiter
- Cold Intolerance

Cardiovascular

- Bradycardia, Angina
- CHF, Pericardial Effusion
- Hyperlipidemia, Xanthelsma
- Decreased ventricular contractility
- Increased diastolic blood pressure

Hematological

- Iron def. Anemia,
- Normocytic /chromic Anemia

Gastro-intestinal

- Decreased GI motility
- Constipation, Ileus,
- Ascites

Nervous System

- Carpel tunnel syndrome
- Deafness, Hoarseness
- Cerebellar ataxia
- Delayed DTR, Myotonia
- Depression, Psychosis
- Decreased concentration
- Memory Loss
- General lack of interest

Multi system effects - Hypothyroidism

Musculoskeletal

- Muscle stiffness
- Cramps, pain, weakness, myalgia
- Carpel tunnel syndrome
- Delayed DTR, Myotonia
- Slow muscle-stretch reflexes,
- Muscle enlargement,
- Muscle atrophy

Renal

- Fluid retention and edema
- Decreased glomerular filtration
- High Urea & Creatinine

Dermatological

- Dry, coarse (flaky) skin and hair
- Alopecia
- Loss of scalp hair and / or lateral eyebrow hair
- Myxoedema,
- Vitiligo, Carotenemia, Xanthomata
- Malar flushes

Reproductive system

- Arrest of pubertal development
- Reduced growth velocity
- Menorrhagia, Amenorrhea
- Anovulation, Infertility
- Impotence, Inc. Prolactin

Hepatic

- Increased LDL / TC
- Elevated LDL + triglycerides

Clinical Manifestations of Hypothyroidism

	Presentation	Signs and implications
General metabolism	Weight gain, cold intolerance, fatigue	Increase in body-mass index, low metabolic rate, myxedema*, hypothermia*
Cardiovascular	Fatigue on exertion, shortness of breath	Dyslipidaemia, bradycardia, hypertension, endothelial dysfunction or increased intima-media thickness*, diastolic dysfunction*, pericardial effusion*, hyperhomocysteinemia*, electrocardiogram changes*
Neurosensory	Hoarseness of voice, decreased taste, vision, or hearing	Neuropathy, cochlear dysfunction, decreased olfactory and gustatory sensitivity
Neurological and psychiatric	Impaired memory, paresthesia, mood impairment	Impaired cognitive function, delayed relaxation of tendon reflexes, depression*, dementia*, ataxia*, Carpal tunnel syndrome and other nerve entrapment syndromes*, myxedema coma*
Gastrointestinal	Constipation	Reduced oesophageal motility, non-alcoholic fatty liver disease*, ascites (very rare)
Endocrinological	Infertility and subfertility, menstrual disturbance, galactorrhoea	Goiter, glucose metabolism dysregulation, infertility, sexual dysfunction, increased prolactin, pituitary hyperplasia*
Musculoskeletal	Muscle weakness, muscle cramps, arthralgia	Creatine phosphokinase elevation, Hoffman's syndrome*, osteoporotic fracture* (most probably caused by overtreatment)
Haemostasis and haematological	Bleeding, fatigue	Mild anaemia, acquired von Willebrand disease*, decreased protein C and S*, increased red cell distribution width*, increased mean platelet volume*
Skin and hair	Dry skin, hair loss	Coarse skin, loss of lateral eyebrows*, yellow palms of the hand*, alopecia areata*
Electrolytes and kidney function	Deterioration of kidney function	Decreased estimated glomerular filtration rate, hyponatraemia*

*Uncommon presentation.

Table 1: Clinical presentation and implications of hypothyroidism

Clinical Manifestations of Hypothyroidism

signs and symptoms
not always conclusive

Hypothyroidism (Underactive) % Cases	
Weakness	99
Dry or coarse skin	97
Fatigue	91
Slow speech	91
Swelling of eyelids	90
Cold intolerance	89
Thick tongue	82
Slow movements	80
Swelling of face	79
Memory impairment	75
Constipation	61
Weight gain	59
Hair loss	57
Trouble breathing or shortage of breath	35
Ankle swelling	55
Menstrual problems	32
Goiter	30
Slowed heart rate	10

Clinical Manifestations of Hypothyroidism

COMMON SIGNS AND SYMPTOMS IN HYPOTHYROIDISM IN CENTRAL PART OF IRAN (Shahrood).
Dr. Ali Jabbari et al. Pak J Med Sci 2008 Vol. 24 No. 1

Table-I: Most common Symptoms of hypothyroidism in cases referred to health services in Shahrood

	N	%
Cold intolerance	45	95
Weight gain	42	84
Menorrhagia	39	92.85*
Muscle/joint pain or weakness	38	76
Constipation	38	76
Menstrual irregularity	35	83.3*
Loss of energy	35	70
Dry skin & hair	32	64
Palpitation	32	64
Inability to concentration	10	20
Depression	8	16
Vocal cord dysfunction	2	4
Drowsiness	1	2

* Percentages are calculated between females.

Table-II: Most common Signs of hypothyroidism in cases referred to health services in Shahrood city

	N	%
Pallor	40	80
Hyporeflexia	30	60
Loss of scalp hair	15	30
Goiter	10	20
Bradycardia	8	16
Hypothermia	6	10
Loss of axillary & public hair	3	6
Decreased sweating	2	4
Abdominal distension	2	4
Macroglossia	2	4
Myxedema	1	2
Dependent edema	1	2

Clinical Manifestations of Hypothyroidism

Table 2

Current Symptoms of Hypothyroidism



Table 2. Current Symptoms of Hypothyroidism

Symptom	Hypothyroid with Symptoms, %	Euthyroid with Symptoms, %	Likelihood Ratio (95% Confidence Interval)
Hoarse voice*	17	4	4.2 (1.7, 10.6)
Deep voice	16	8	2.1 (1.0, 4.6)
Dry skin*	71	54	1.3 (1.1, 1.6)
Coarse hair	9	14	0.7 (0.3, 1.5)
Cold sensitive	51	40	1.3 (0.9, 1.7)
Tired	40	30	1.4 (0.9, 2.0)
Puffy eyes	27	17	1.6 (1.0, 2.7)
Muscle cramps*	34	15	2.2 (1.4, 3.7)
Weak muscles	21	21	1.0 (0.6, 1.7)
Constipated	17	10	1.6 (0.8, 3.3)
Depressed	16	12	1.4 (0.7, 2.7)
Slow thinking	18	10	1.8 (0.9, 3.5)
Poor memory	18	16	1.1 (0.6, 2.0)
Math difficulty	15	11	1.4 (0.7, 2.8)
Irregular menses	30	29	1.0 (0.5, 2.0)
Heavy menses	36	29	1.2 (0.7, 2.3)

*Indicates statistical significance.

Clinical Manifestations of Hypothyroidism

Cause	Pathogenesis	Goiter	Degree of Hypothyroidism
Hashimoto's thyroiditis	Autoimmune destruction of thyroid	Present early, absent later	Mild to severe
Drug-induced¹	Blocked hormone formation ²	Present	Mild to moderate
Dyshormonogenesis	Impaired synthesis of T4 due to enzyme deficiency	Present	Mild to severe
Radiation, ¹³¹I, x-ray, thyroidectomy	Destruction or removal of gland	Absent	Severe
Congenital (cretinism)	Athyreosis or ectopic thyroid, iodine deficiency; TSH receptor-blocking antibodies	Absent or present	Severe
Secondary (TSH deficit)	Pituitary or hypothalamic disease	Absent	Mild

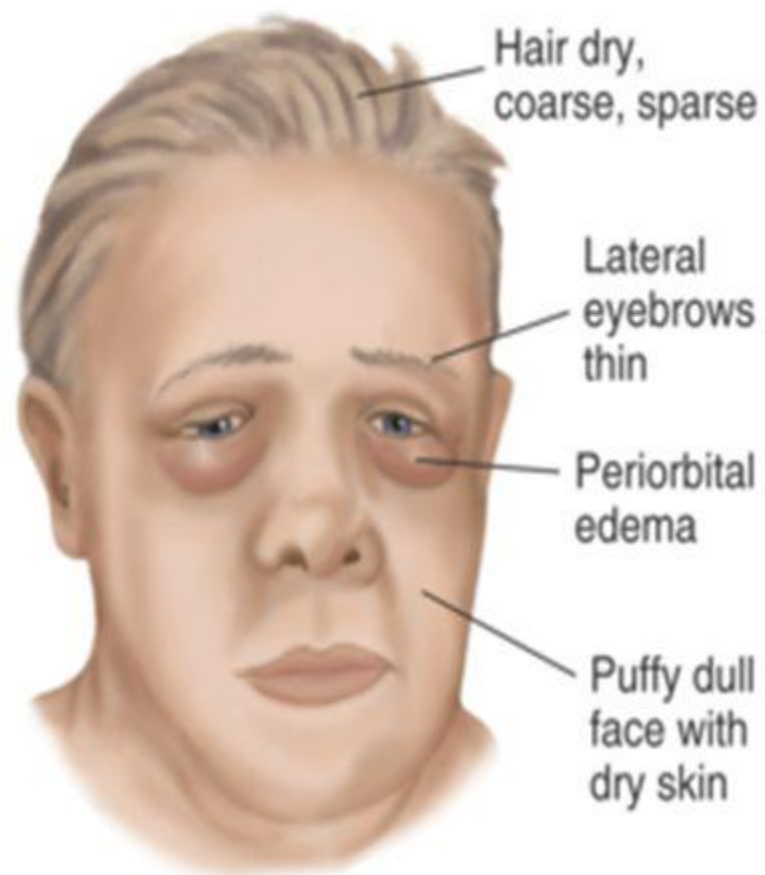
Non-specific Manifestations of Hypothyroidism

Skin

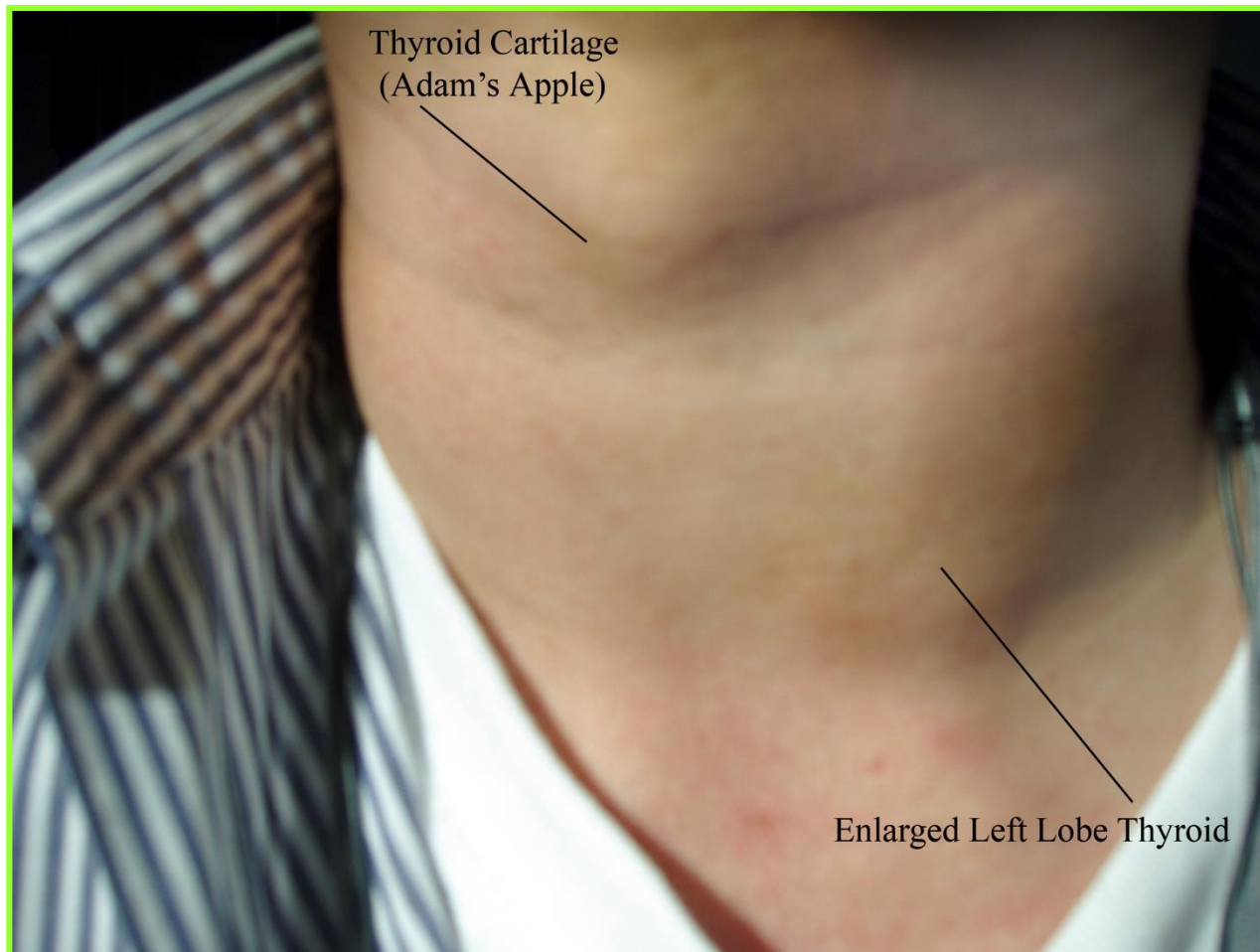
- Cool, dry, pale
- Xerosis
- Hypohidrosis
- Yellowish hue secondary to carotenemia
- Generalized myxedema: swollen waxy appearance
- Swollen lips, broad nose, macroglossia
- Purpura secondary to impaired wound healing

Hair

- Dry, brittle, coarse hair
- Diffuse alopecia, Telogen effluvium
- Loss of lateral third of eyebrow (madarosis)



Thyromegaly



Facial Myxedema



Facial Myxedema



• ANA • ds DNA • CCP • AMH • Folate • PTH

• CA 125 • CA 19-9 • CA 15-3

NEW KITS

تولید کننده

• کیت‌های تشخیص طای الایزا •

Periorbital Myxedema (before & after)



Fig. 7.3 Features of a patient with severe hypothyroidism. (a) Clinical presentation with marked periorbital myxedema, dry and cool skin and fatigue. (b) Significant

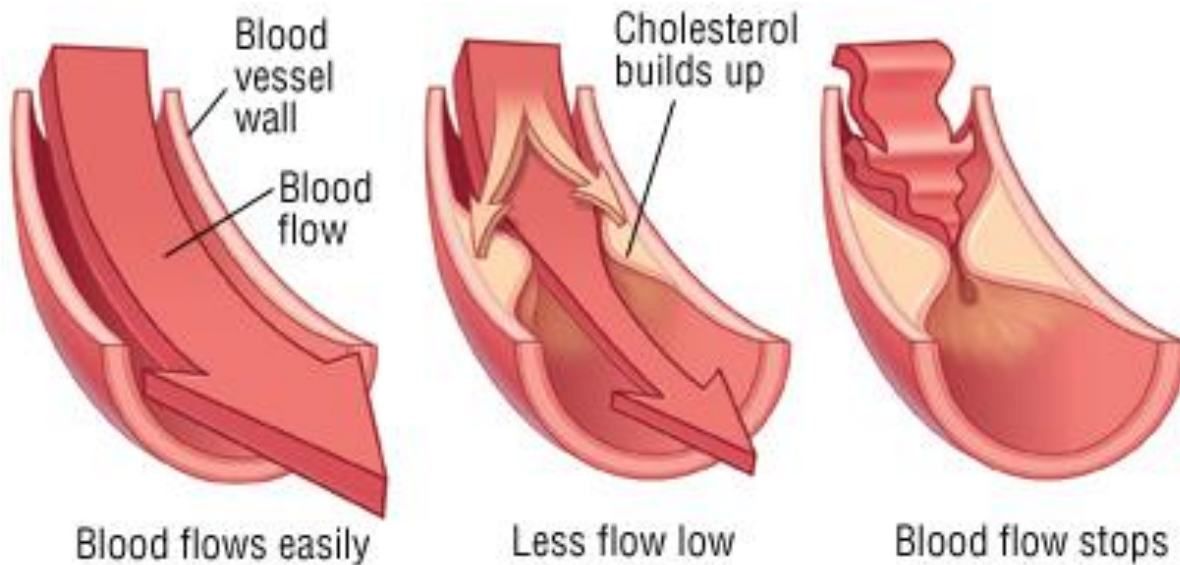
improvement of signs and symptoms of hypothyroidism 3 months after the introduction of levothyroxine

MacroGlossia

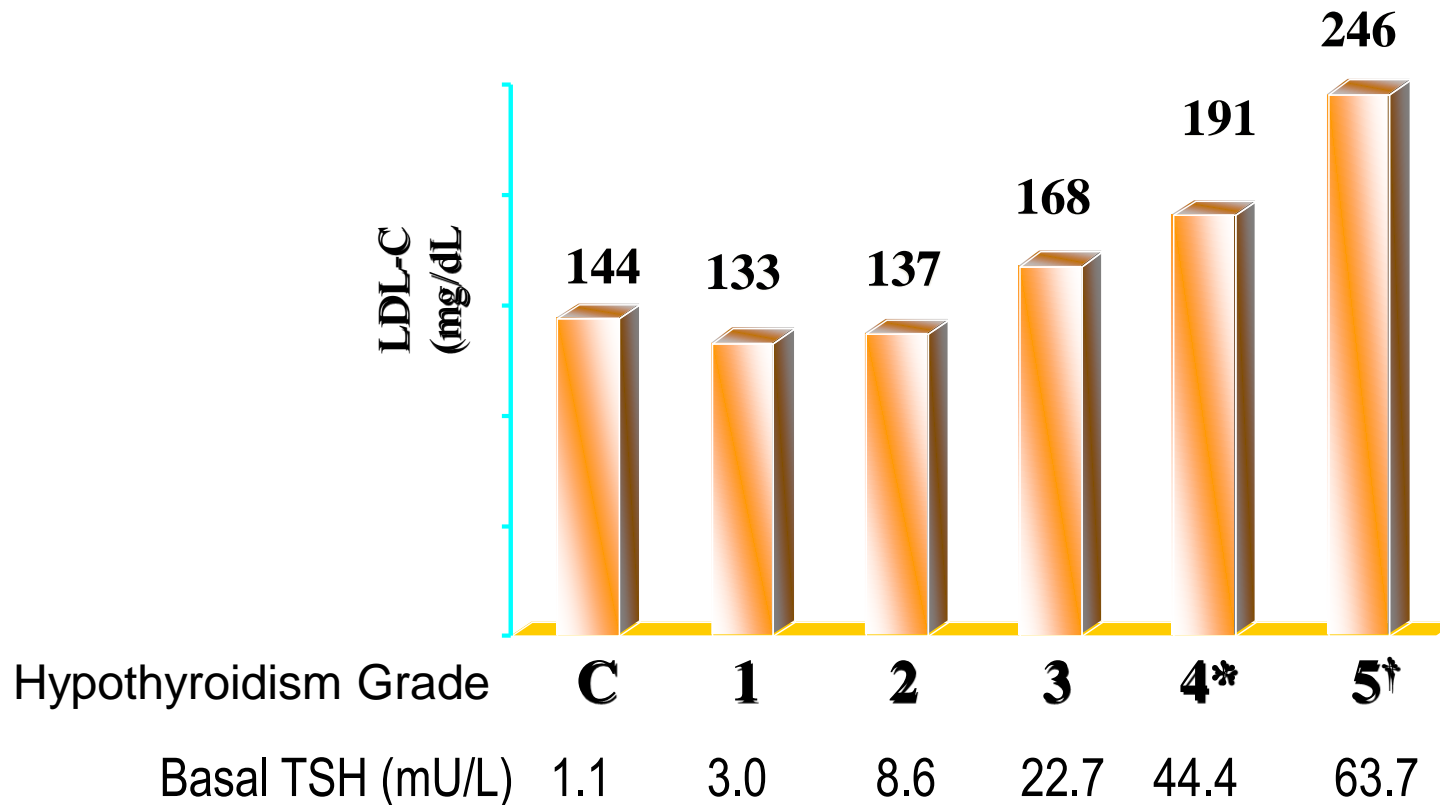


Hypothyroidism and Hypercholesterolemia

- 14% of patients with elevated cholesterol have hypothyroidism
- Approximately 90% of patients with overt hypothyroidism have increased cholesterol and / or triglycerides



LDL-C Levels Increase With Increasing Hypothyroidism Grade



Xanthomata

Tuberous Xanthoma



Xanthelasma



Skin Color Changes



Carotenemia



Malar flushes

Myxedema with Caroteneamia



Finger Nail Changes

Hypothyroid Fingernails - Paronychia



Dr. Peter Osborne for HypothyroidMom.com



Finger Nail Changes



Finger Nail Changes

Hypothyroid Fingernails - Splitting



Dr. Peter Osborne for HypothyroidMom.com



Finger Nail Changes



Brittle Nail

Telogen effluvium



Pericardial Effusion in Hypothyroidism

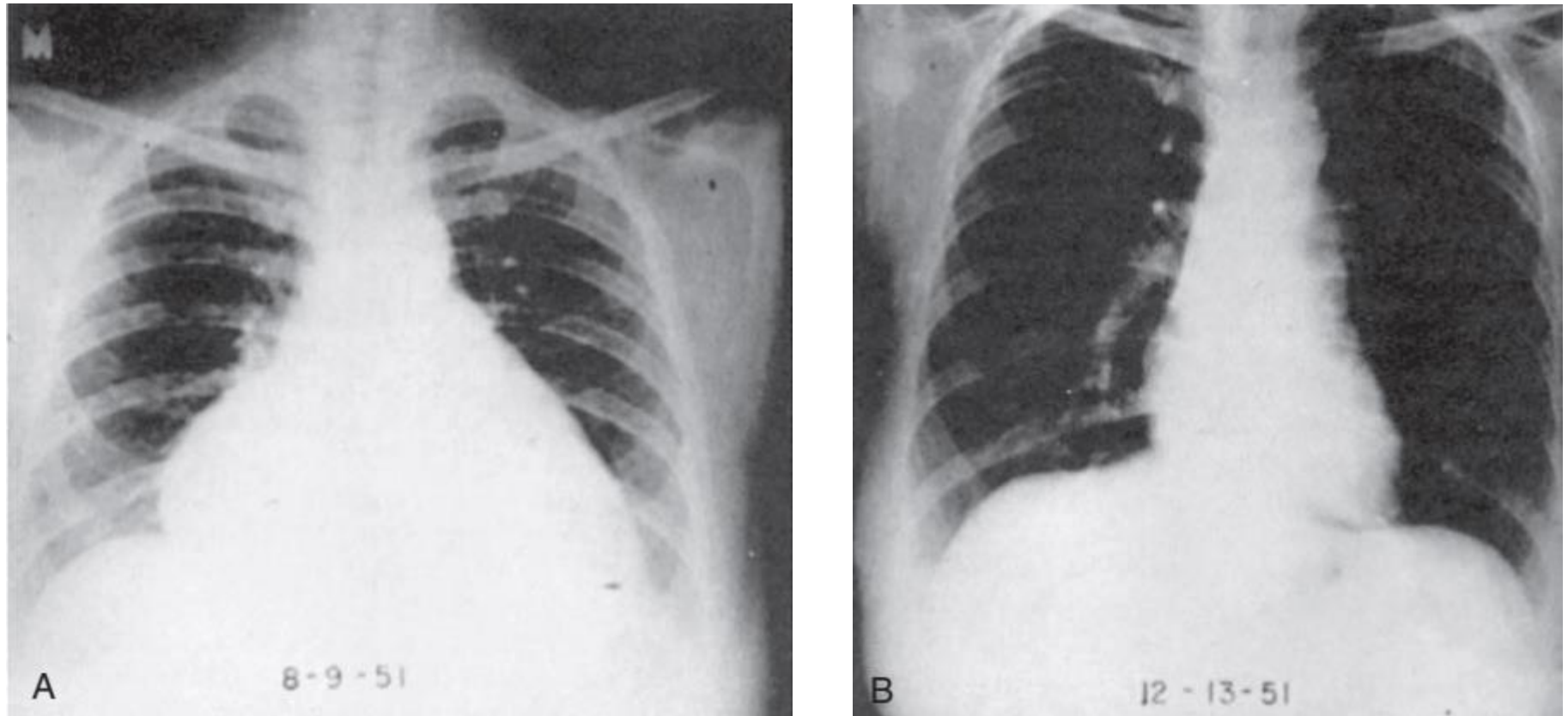


Fig. 13.2 (A and B) Chest roentgenograms in a patient with myxedema heart disease. The patient had signs of severe congestive heart failure and was given thyroid hormone alone. **Within 4 months**, the heart had returned to normal size (B) and there was no evidence of underlying heart disease.

CLINICAL MANIFESTATIONS OF SPECIFIC CAUSES OF HYPOTHYROIDISM

Finding	Cause of hypothyroidism
Diffuse or nodular goiter	Chronic autoimmune thyroiditis, ingestion of antithyroid substances Iodine deficiency or excess (almost always in known endemic areas)
Headache	Pituitary or hypothalamic tumor
Visual impairment	Pituitary or hypothalamic tumor
Deficiency or excess of pituitary hormones other than TSH	Pituitary or hypothalamic tumor

Hypothyroidism and Depression



Automated
Immunoassay System



Electro-chemiluminescence
Immunoassay (ECLIA) System



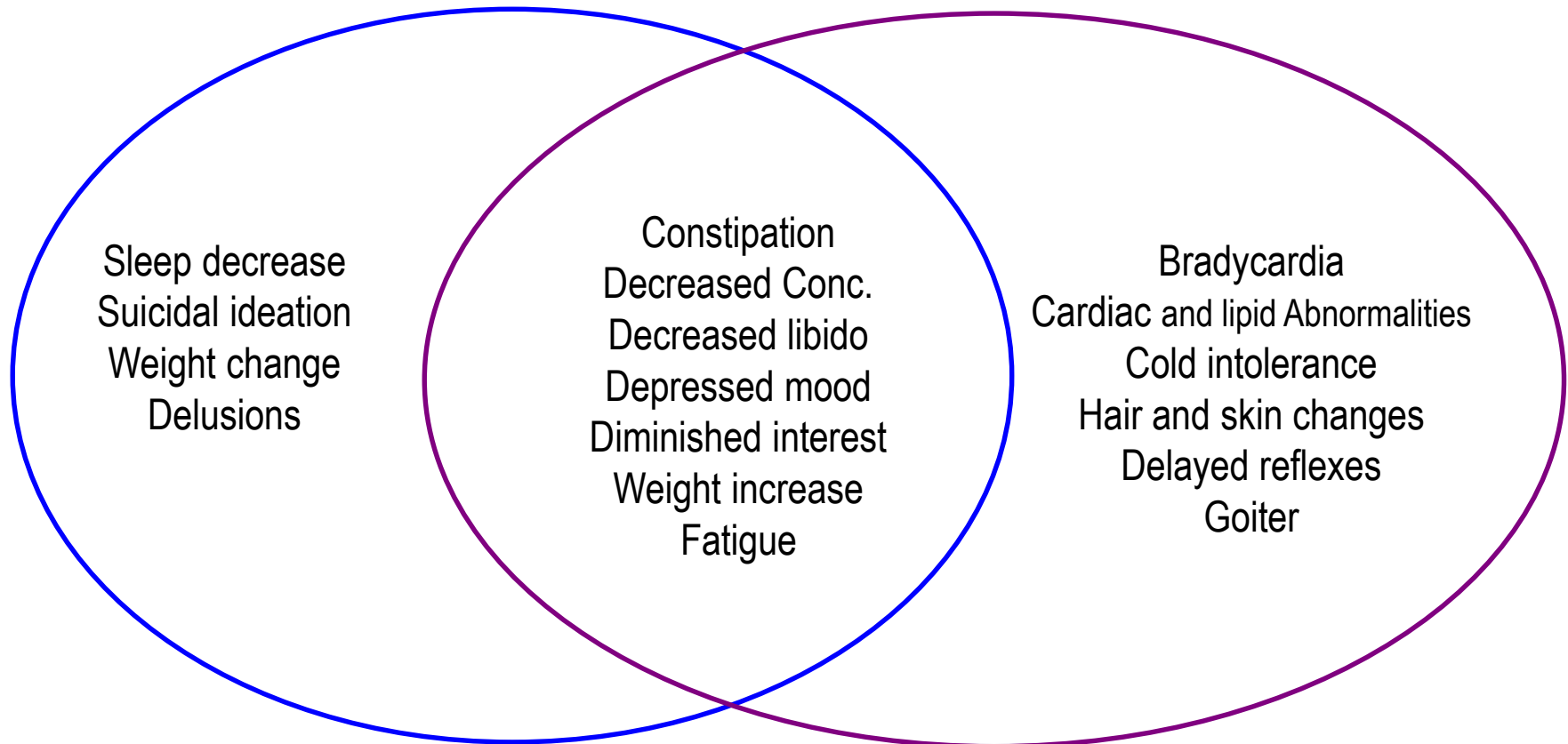
Clinical & Research
Microscopes



Hypothyroidism and Depression

Depression

Hypothyroidism



Pathogenesis



Magnüs
microscopes

▼ **MX21i**
CLINICAL MICROSCOPE

Anti fungus optics
Plan superior imaging
Rackless stage for durability and ease of use
Ergonomic and compact design for user convenience
Aspheric light relay system for bright and uniform illumination

Optional Accessories

Dual Filter (S&O)
Triocular Head With USB Digital Camera

شیرکت بینان درمان
تلفن: ۰۵۰-۸۸۷۰۳۰۵ (خط ۱۰)

Iodine Deficiency Disorders (IDD)





Lifotronic

eCL8000
Electro-chemiluminescence Immunoassay (ECLIA) System

Advantages of Electro-chemiluminescence Immunoassay

- Controlable Optical Signal
- High Sensitivity and Precision
- Magnitude of Luminescent Intensity Reaches Six Orders
- Compatible with Small Sample Volume
- High Stability for Reagent
- One of The ECLIA System in the World

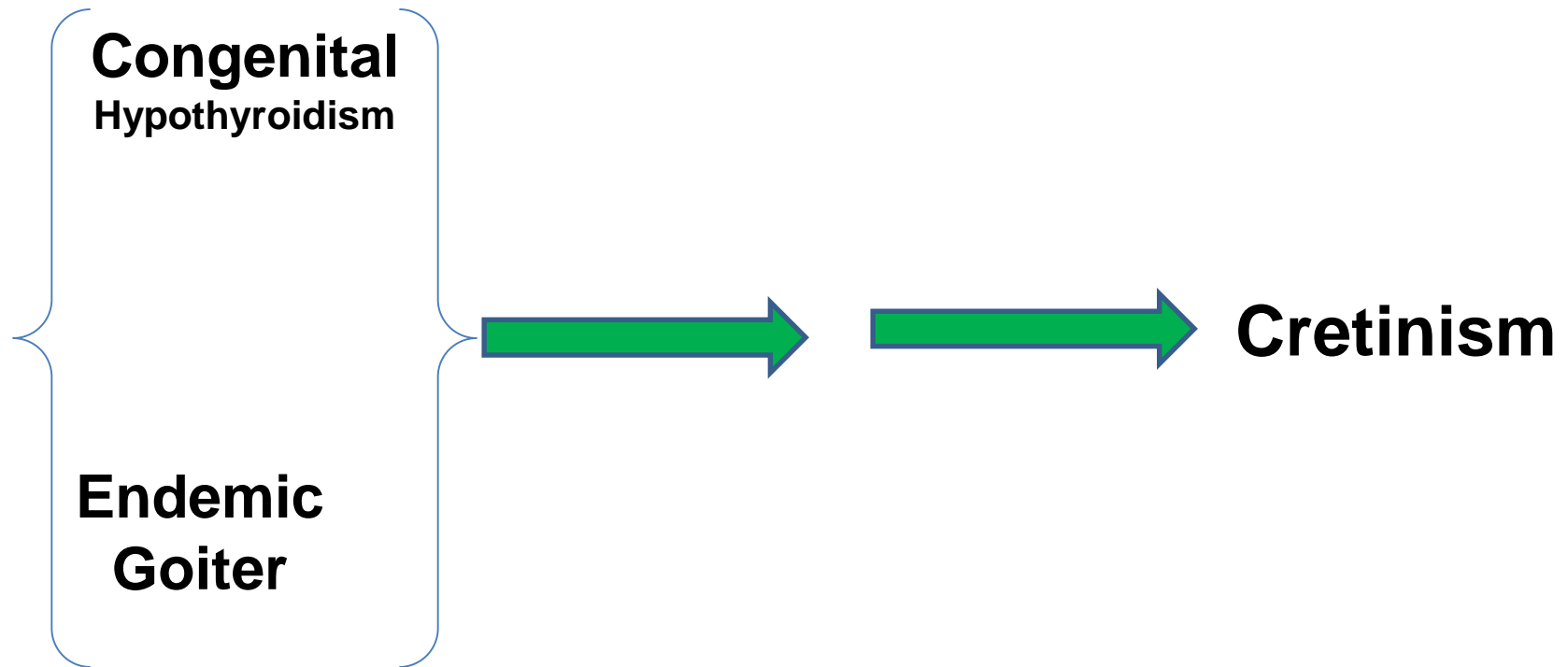


شرکت بنیان درمان
تلفن: ۰۵۰۰۰۸۸۷-۰۱ (خط ۱)

Iodine deficiency disorders (IDDs)

WHO definition:

Iodine deficiency disorders (IDD) refer to all of the consequences of iodine deficiency in a population that can be prevented by ensuring that the population has an adequate intake of iodine.



اختلال‌های ناشی از کمبود ید

دکتر حسین دلشاد، دکتر فریدون عزیزی، دکتر نازنین مصلحی

IDDs

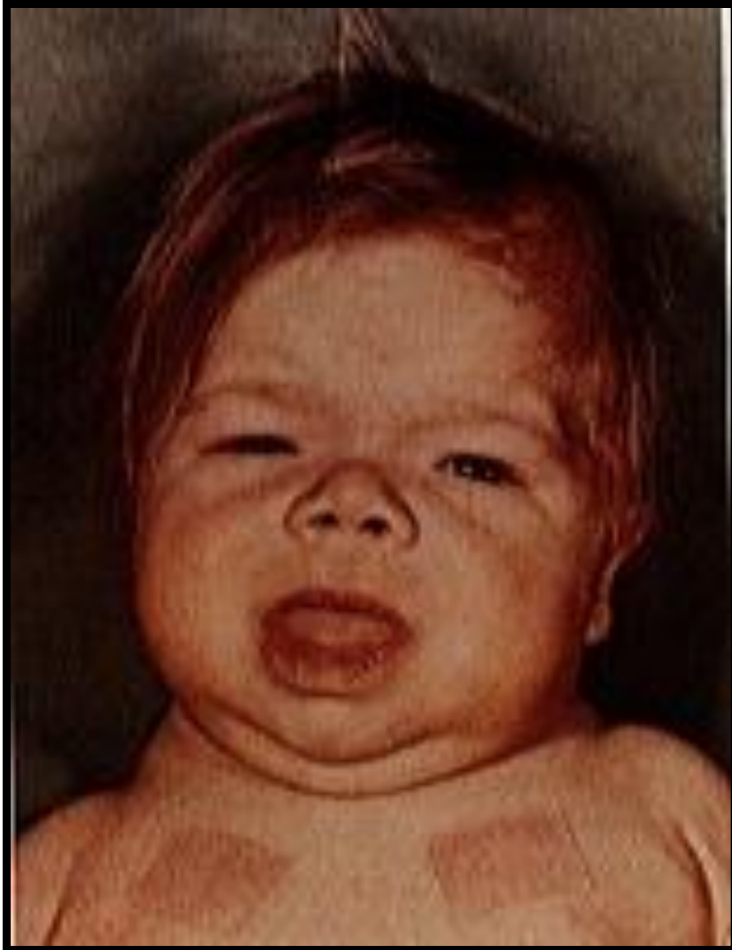
جدول ۱- طیف اختلالهای ناشی از کمبود ید

مرحله کمبود	عوارض و اختلالها
دوران جنینی	سقط، تولد جنین مرده، ناهنجاریهای مادرزادی، اختلالهای حرکتی، روانی و ذهنی، کم کاری تیروئید، کرتنیسم عصبی و میکزادمی، دیپلژی اسپاستیک، کری و لالی، عقب ماندگی روانی و ذهنی
نوزادی، کودکی و نوجوانی	افزایش مرگ و میر نوزادی، کم کاری تیروئید نوزادی، تاخیر رشد فیزیکی و ذهنی
بزرگسالان	گواتر توام با عوارض آن، پر کاری تیروئید پس از جبران کمبود ید
تمام سنین	گواتر، کم کاری تیروئید، اختلال عملکرد ذهنی، افزایش استعداد به آسیب های ناشی از رادیاسیون هسته ای

Endemic Goiter (a global challenge)



Congenital Hypothyroidism



WHO: On a worldwide basis, iodine deficiency is the single most important preventable cause of brain damage.

Cretinism

Severe mental retardation

Severe growth deficit

Paraplegia (lower limb
paralysis)

Rigidity

Deaf-mutism

Facial disturbances

The type and severity of
brain, neural and
musculoskeletal defects
arise from timing, severity
and duration of deficiency.

Photo used with permission of the ICCIDD.



Figure 5: Cretin in China J Dunn, 1991

IDDs



شکل ۴ - بیمار مبتلا به کرتینیس میکسدمی



شکل ۳ - بیمار مبتلا به کرتینیسم عصبی

IDDs

جدول ۴ - مقایسه بالینی دونوع کرتینیسم عصبی و میکسدمی

تظاهر بالینی	کرتینیسم عصبی	کرتینیسم میکسدمی
عقب ماندگی ذهنی	اغلب در فرم شدید وجود دارد	در فرم خفیف تر وجود دارد
کری و لالی	معمولا وجود دارد	وجود ندارد
دیپلژی مغزی	اغلب وجود دارد	وجود ندارد
انحراف چشم ها	اغلب وجود دارد	وجود ندارد
قد	معمولا طبیعی است	تاخیر رشد شدید معمول است
مشخصات کلی	نشانه‌هایی از کم کاری تیروئید وجود ندارند	نشانه‌های کم کاری شدید تیروئید وجود دارند
رفلکس‌ها	تشدید یافته	تاخیر زمان بازگشت
نوار قلبی	طبیعی	کاهش ارتفاع کمپلکس QRS تام با برادیکاردی
رادیوگرافی اندام‌ها	طبیعی	دیسرئزی اپی فیزها
تاثیر هورمون‌های تیروئید	بدون تاثیر	باعث بهبودی می‌شود

Daily Idoine Requirements

جدول ۲ - مقدار توصیه شده دریافت روزانه ید توسط سازمان جهانی بهداشت

مقدار توصیه شده (میکروگرم در روز)	گروه سنی
۹۰	کودکان صفر تا ۵ سال
۱۲۰	کودکان ۶ تا ۱۲ سال
۱۵۰	بالغین بالای ۱۲ سال
۲۵۰	زمان بارداری
۲۵۰	زمان شیر دهی

Common sources of iodine in adults (USA)

Dietary iodine

Daily intake (µg)

Dairy products	52
Grains	78
Meat	31
Mixed dishes	26
Vegetables	20
Desserts	20
Eggs	10
Iodized salt	380

Other iodine sources

(µg)

Vitamin/mineral prep (per tablet)	150
Amiodarone (per tablet)	75,000
Povidone iodine (per mL)	10,000
Iodate (per capsule)	308,000

Goitrogens

جدول ۳- مواد غذایی گواتروژن و نحوه عمل آنها در بروز گواتر

نحوه عمل	گواتروژن‌ها
حاوی گلوکوزیدهای سیانوژنیک بوده که به تیوسیانات‌ها تبدیل می‌گردند و مانع ورود ید بداخل غده تیروئید می‌شوند.	کاساوا، لوبیا، تخم کتان، ارزن هندی، سیب زمینی شیرین
حاوی گلوکوزینولات‌ها بوده که با جذب ید توسط غده تیروئید رقابت می‌کنند.	کلم، کلم پیچ، گل کلم، بروکلی، شلغم
فلاونیدهای موجود باعث اختلال فعالیت آنزیم پراکسیداز می‌شوند.	سویا، ارزن
تجمع پراکسیداز ممکن است باعث تخریب سلول‌های تیروئید گردیده و کمبود دیودیناز نیز سنتز هورمون تیروئید را مختل می‌نماید.	کمبود سلنیوم
باعث کاهش فعالیت آنزیم تیروئید پراکسیداز وابسته به هم (Heme) گردیده و ممکن است در کارایی اقدامات پیشگیری کننده از کمبود ید تداخل ایجاد نماید.	کمبود آهن
از طریق کاهش اثر مهار کنندگی واسطه به ویتامین A ژن $TSH\beta$ ، باعث افزایش تحریک TSH و گواتر می‌گردد.	کمبود ویتامین A

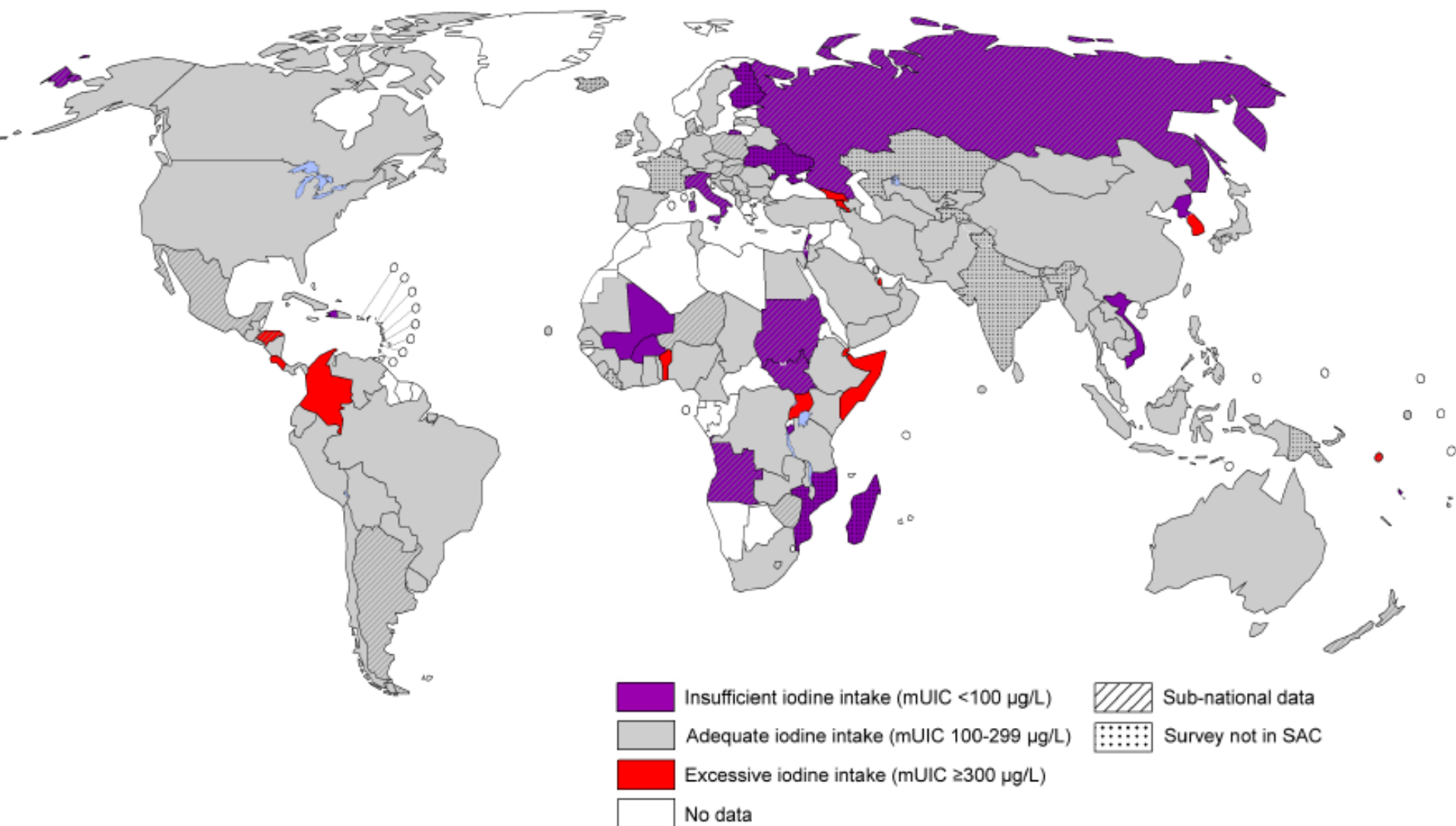
IDDs

جدول ۵ - شاخص‌های اپیدمیولوژیکی ارزیابی وضعیت تغذیه ای ید جامعه بر اساس میانه ید ادرار

جمعیت هدف	میانه ید ادرار (میکروگرم در لیتر)	میزان دریافت ید و وضعیت ید جامعه
کودکان دبستانی	کمتر از ۲۰	ناکافی، کمبود شدید ید
	۲۰ تا ۴۹	نا کافی، کمبود متوسط ید
	۵۰ تا ۹۹	ناکافی، کمبود خفیف ید
	۱۰۰ تا ۱۹۹	کافی، مطلوب
	۲۰۰ تا ۲۹۹	بیشتر از حد کفایت خطر بروز پرکاری تیروئید ناشی از ید در افراد مستعد
	بالای ۳۰۰	بیشتر از حد کفایت خطر بروز پر کاری تیروئید ناشی از ید و بیماری‌های خود ایمنی تیروئید
	کمتر از ۱۵۰	ناکافی
خانم‌های باردار	۱۵۰ تا ۲۴۹	کافی
	۲۵۰ تا ۴۹۹	بیشتر از حد کفایت
	مساوی یا بیشتر از ۵۰۰	بیشتر از حد کفایت
	کمتر از ۱۰۰	ناکافی
خانم‌های شیرده و کودکان کمتر از ۲ سال	مساوی یا بیشتر از ۱۰۰	کافی

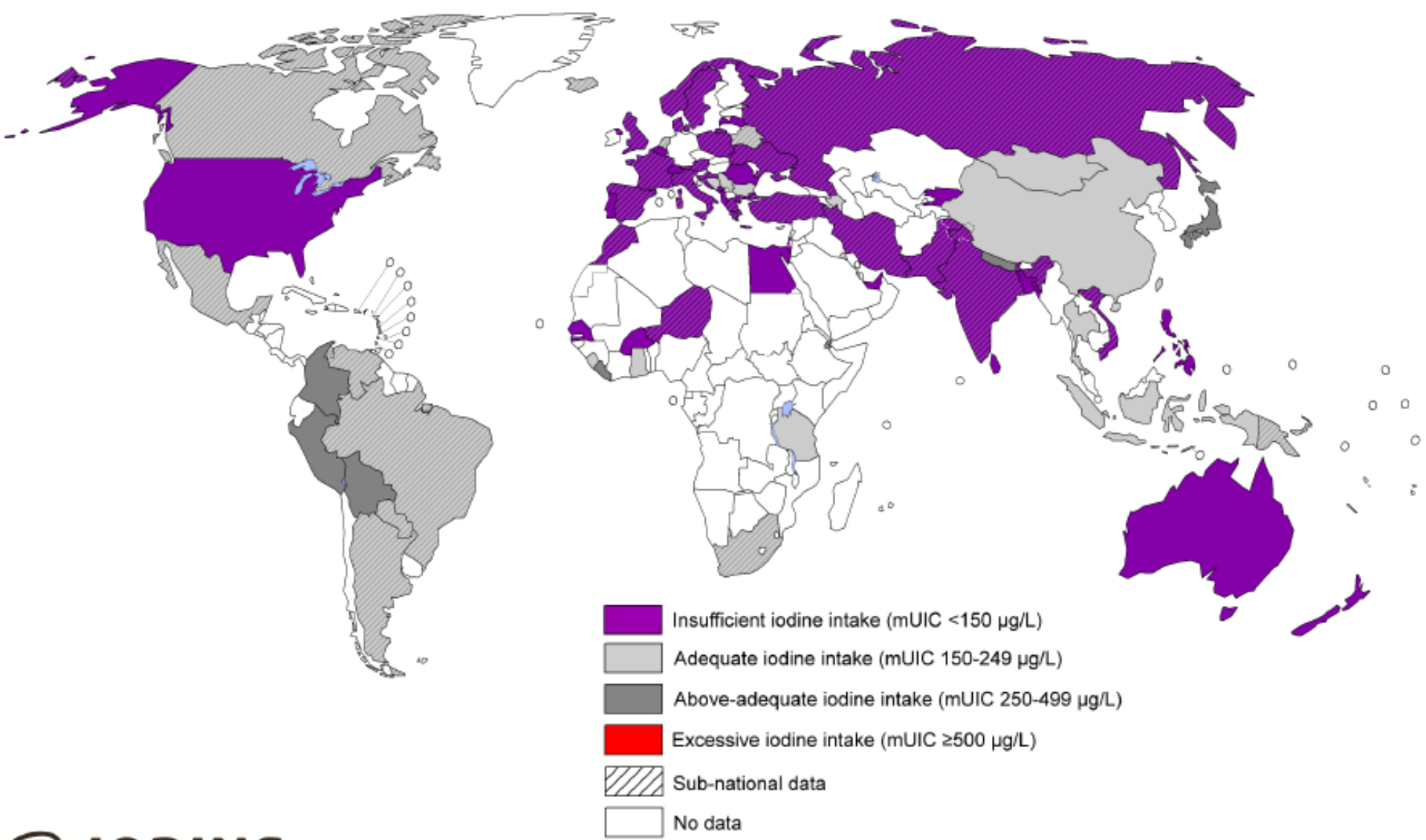
Global Scorecard of Iodine Nutrition 2017

Based on median urinary iodine concentration (mUIC) in school-age children (SAC) and adults



Global Scorecard of Iodine Nutrition 2017

Based on median urinary iodine concentration (mUIC) in pregnant women



Congenital Hypothyroidism (CH) screening programme in Iran

Evaluation of the congenital hypothyroidism screening programme in Iran: a 3-year retrospective cohort study. Arch Dis Child Fetal Neonatal Ed. 2018, Azizi F. et. al.

OBJECTIVE:

To evaluate the newborn screening programme for congenital hypothyroidism (CH) in Iran from diagnosis to management and follow-up for 3 years from 2011 to 2014.

DESIGN:

Retrospective cohort.

SETTING AND PATIENTS:

Seventeen university districts were randomly selected from 30 provinces. Central data in each district were gathered and collectively analysed. Congenital hypothyroid subjects were followed for 3 years.

RESULTS:

Total number of births in 2011 was 501 726,

452 918 neonates (90.3%) were screened and 15 671 (3.46%) were recalled;

1085 (1:462, 0.22%) were confirmed as having CH (57.1%: permanent, 42.9%: transient) and followed for 3 years.

Positive predictive value (PPV) for the first screening test was 6.9%. After the second screening, recall rate was reduced to 0.69% and PPV increased to 31.3%. Median age at screening was 6 (3-9) days and for 90.6% of patients treatment was initiated before 40 days of age with a median levothyroxine dosage of 25 µg/day; 131 (13.4%) were lost to follow-up.

CONCLUSION:

In Iran, despite well-established protocols of screening and detecting CH subjects, stricter implementation of a structured system for monitoring and surveillance is needed to promote the management of patients and to reduce rates of loss to follow-up. Determining and addressing the causes of high false positive rates must be prioritised.

IDDs

جدول ۶- درجه بندی گواتر بر اساس تقسیم بندی سازمان جهانی بهداشت

درجه	شرح
صفر	در معاینه بالینی تیروئید قابل مشاهده و لمس نیست.
یک	در معاینه بالینی تیروئید قابل لمس بوده ولی در وضعیت عادی گردن قابل مشاهده نیست.
دو	در معاینه بالینی علاوه بر قابل لمس بودن، تیروئید در وضعیت عادی گردن نیز قابل مشاهده است.

جدول ۷ - درجه بندی شدت کمبود ید بر اساس شیوع گواتر

شیوع گواتر (درصد)	شدت کمبود ید
کمتر از ۵	کفایت ید رسانی
۵ تا ۱۹/۹	کمبود خفیف ید
۲۰ تا ۲۹/۹	کمبود متوسط ید
بیشتر از ۳۰	کمبود شدید ید

IDDs

جدول ۸ - تقسیم بندی کمبود ید در جامعه

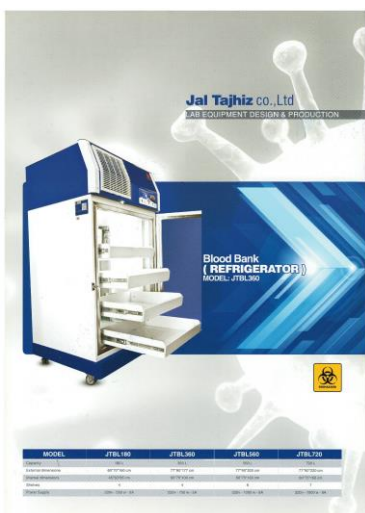
شاخص	بدون کمبود ید	کمبود ید خفیف	کمبود ید متوسط	کمبود ید شدید
میانه ید ادرار (میکرو گرم در لیتر)	بیشتر از ۱۰۰	۵۰ - ۹۹	۲۰ - ۴۹	کمتر از ۲۰
شیوع گواتر (درصد)	کمتر از ۵	۵ - ۲۰	۲۰ - ۳۰	بیشتر از ۳۰
TSH>5mIU/L نوزادان(درصد)	کمتر از ۳	۳ - ۲۰	۲۰ - ۴۰	بیشتر از ۴۰
کرتینیسیم	وجود ندارد	وجود ندارد	وجود دارد	وجود دارد

IDDs

جدول ۹ - شاخص های موثر بودن برنامه پیشگیری و کنترل اختلال های ناشی از کمبود ید در یک کشور

شاخص	هدف
۱- ید دار کردن نمک	
در صد نمک مصرفی خانوارها که ید دار است	۱۰۰٪
در صد نمک هایی که ید آنها درموقع فروش یا مصرف بیش از ۱۵ ppm است	≥ 90
در صد خانوارهایی که از نمک ید دار استفاده می کنند	≥ 90
۲- میزان ید ادرار	
کمتر از ۱۰۰ میکرو گرم در لیتر	$< 50\%$
کمتر از ۵۰ میکرو گرم در لیتر	$< 20\%$
بیشتر از ۵۰۰ میکرو گرم در لیتر	$< 10\%$

Auto-Immune Hypothyroidism



Auto-Immune Hypothyroidism

- Autoimmunity is responsible for over 90% of noniatrogenic hypothyroidism in countries with iodine sufficiency.
- The annual incidence of autoimmune hypothyroidism is around 80 per 100,000 men and 350 per 100,000 women.
- All ages may be affected, although the average age of onset is between 40 and 60 years old.
- The disorder is more frequent in whites and Asians than in African Americans.
- The initial presentation depends on the stage of disease.
- Juvenile and adolescent autoimmune thyroiditis may be self-limiting.
- Hashimoto thyroiditis is the commonest cause of goiter in iodine sufficient regions.
- Atrophic thyroiditis (primary myxedema) presents as hypothyroidism without a goiter.

Thyroid Autoimmunity Mechanisms

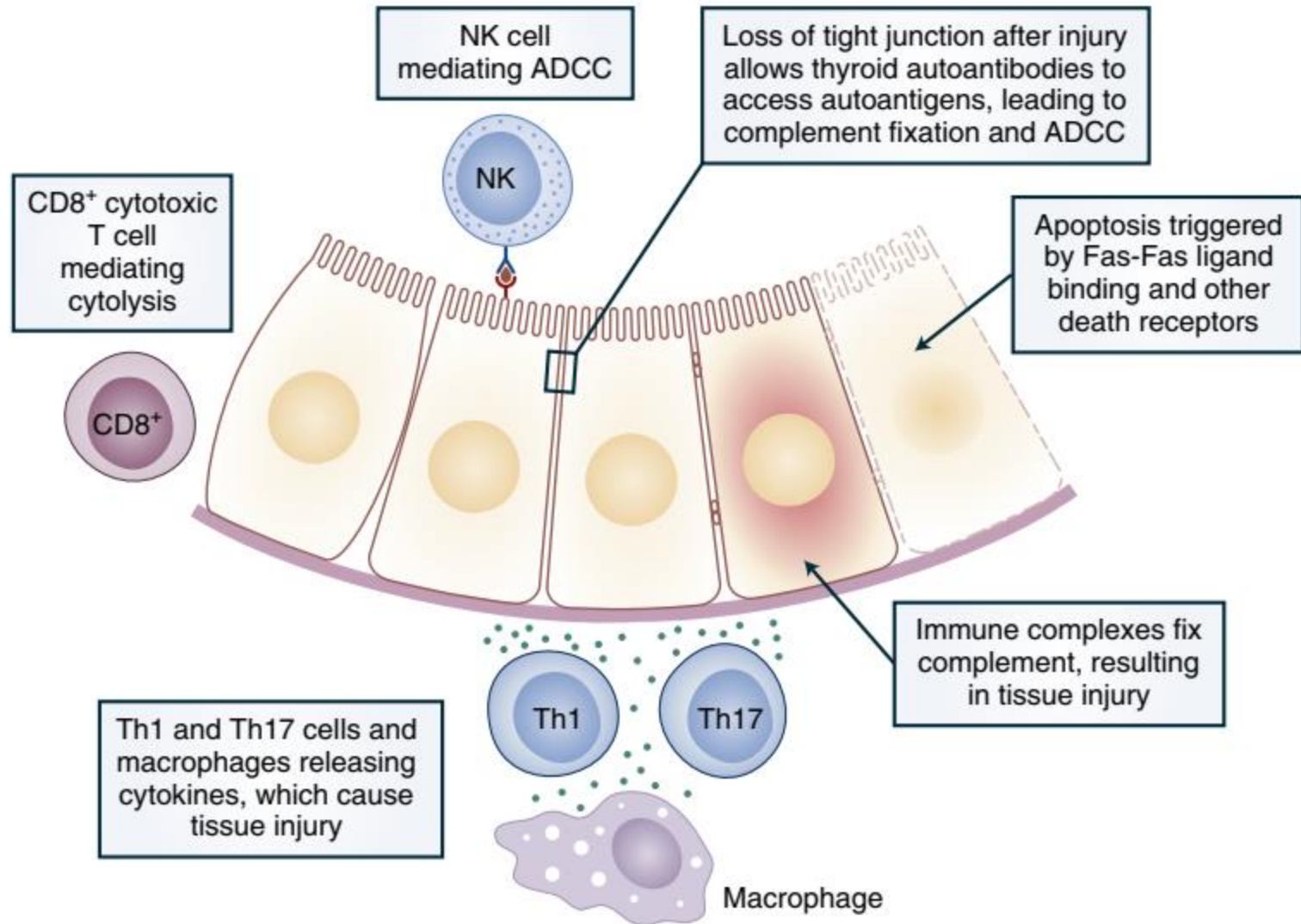
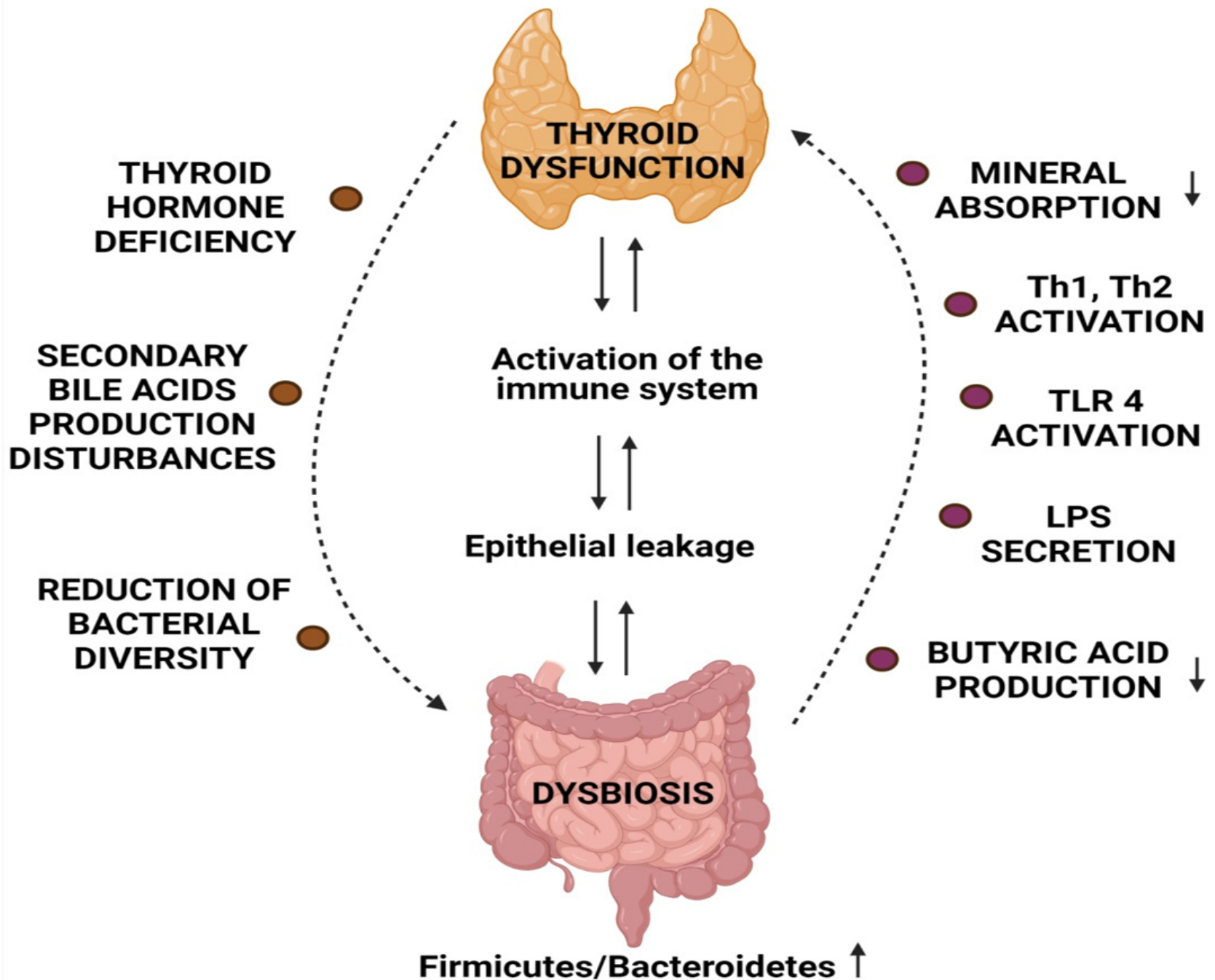


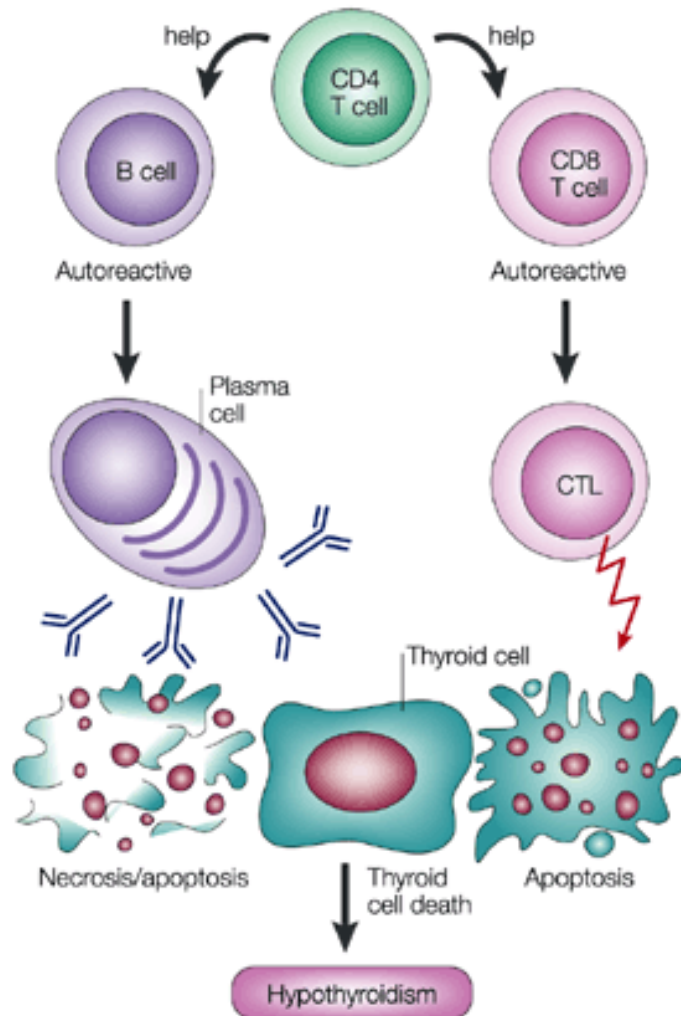
Fig. 13.6 Summary of the main mechanisms involved in the pathogenesis of autoimmune hypothyroidism. ADCC, antibody-dependent cell-mediated cytotoxicity; NK, natural killer.

Hormonal Imbalance

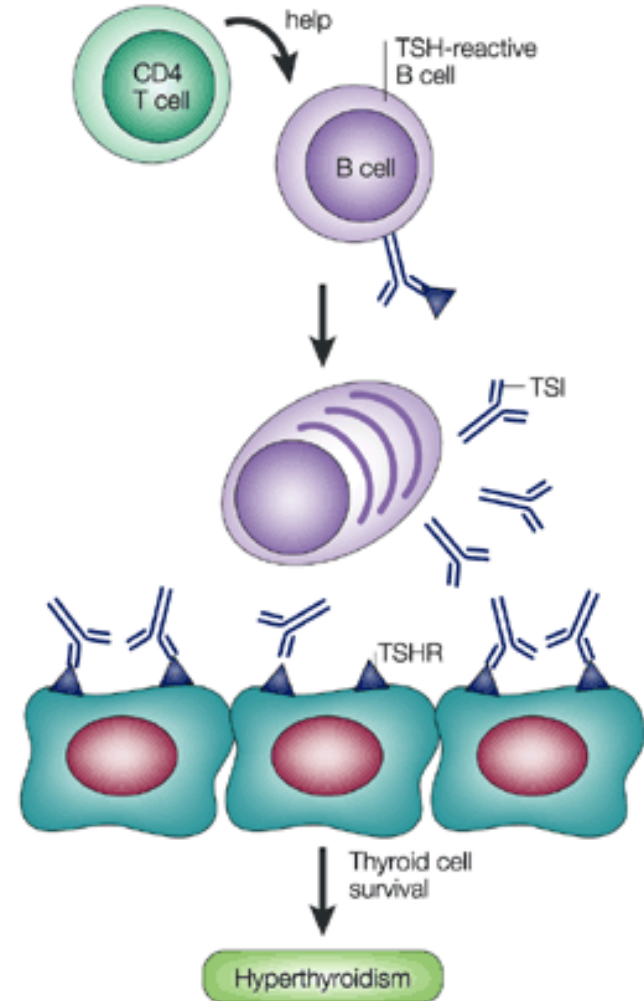


Thyroid Autoimmunity Mechanisms

a Hashimoto's thyroiditis



b Graves' disease



Auto-immune Thyroid Disorders

Antibodies against

TSHR



- Graves' Orbitopathy
- Graves' Dermopathy
- Cancer incidence:
 - Breast
 - Colon,
 - Kidney
 - Uterus
 - Ovary

TPO



- Hashimoto's encephalitis
- Infertility
- Vasculo-placental complications
- Health in aged women
- Cancer incidence:
 - Breast
 - Colon
 - Kidney
 - Uterus
- Survival breast cancer patients

Tg



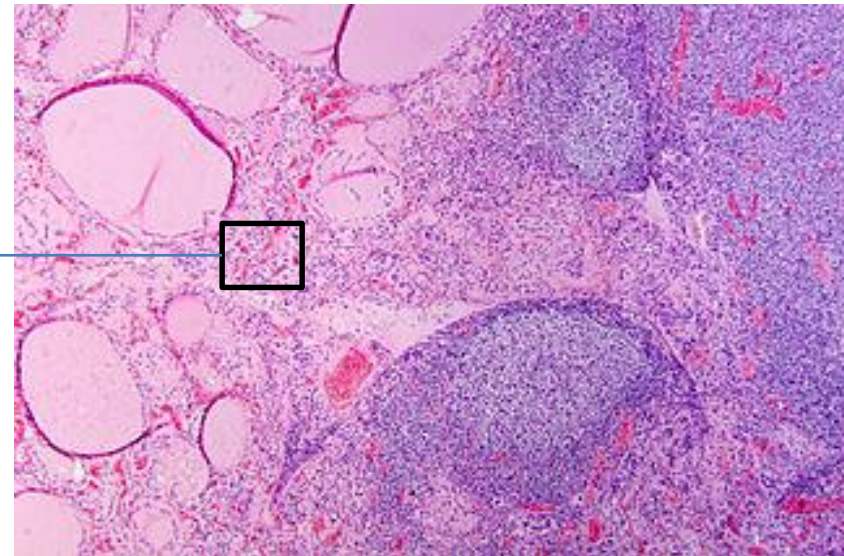
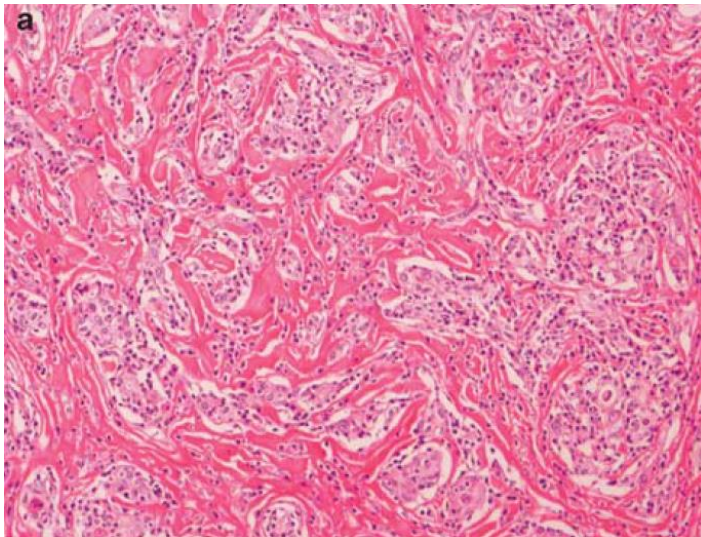
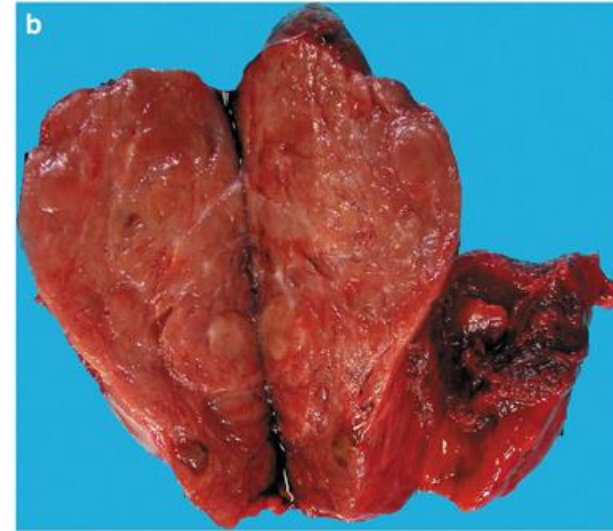
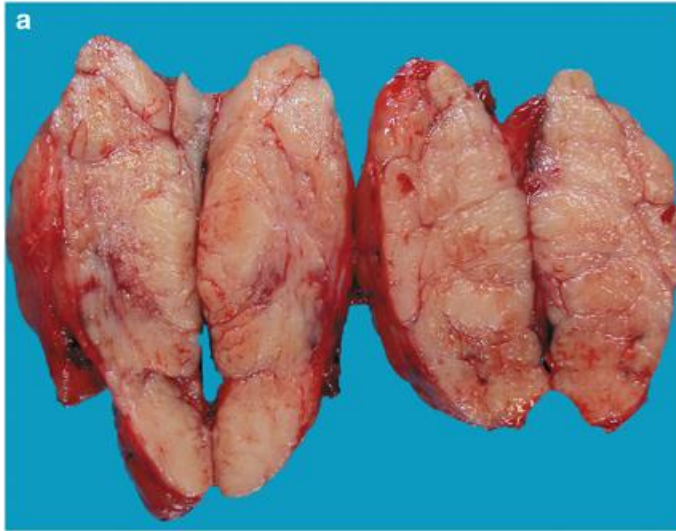
- Infertility
- Cancer incidence:
 - Breast
 - Colon
 - Kidney
 - Uterus
- Survival breast cancer patients

Autoimmune Thyroid Disorders

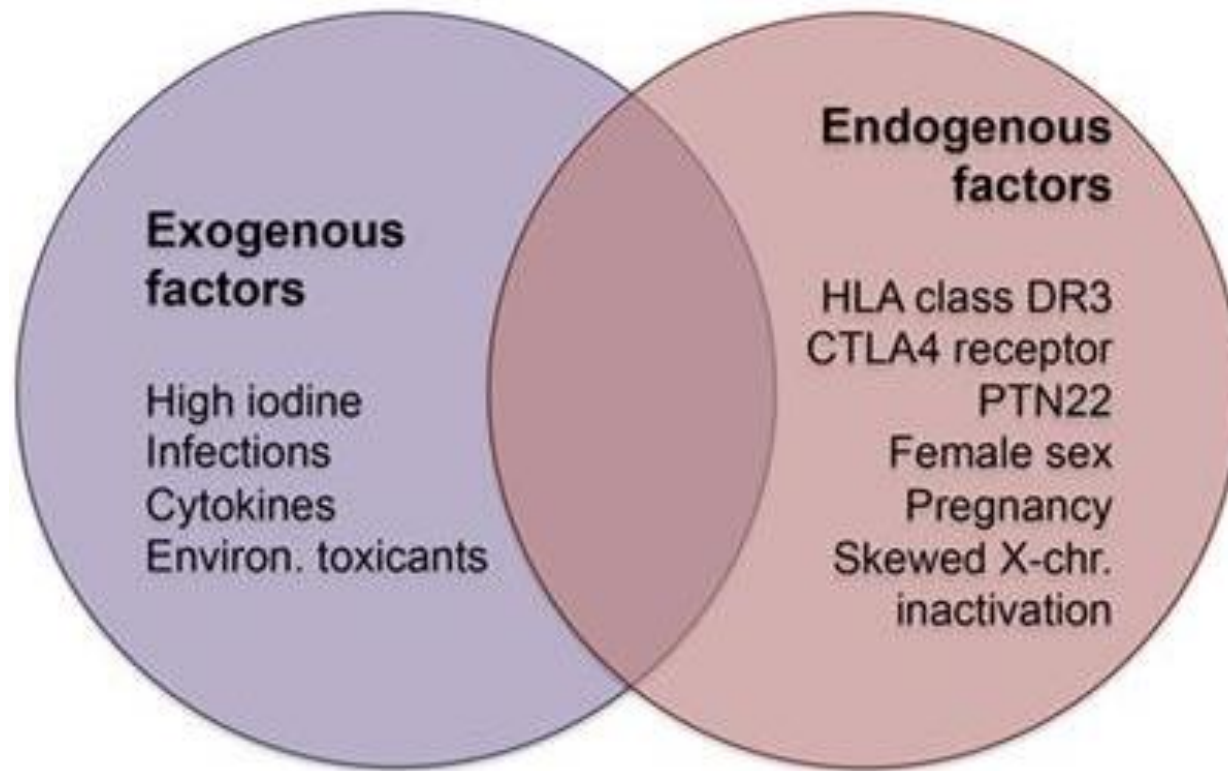
Parameter	Antibodies		
	Anti-TSHR	Anti-TPO	Anti-Tg
Antigen location	Extracellular	Intracellular	Intrafollicular, low levels in blood circulation
Access of immune cells to antigen	Without tissue destruction	After thyrocyte destruction	With and without tissue destruction
Duration of antigen exposure	Short, low levels (normalization upon treatment)	Prolonged time, intermediate levels (pathologic levels also upon treatment)	Prolonged time, high levels (pathologic levels also upon treatment)
Type of antibody	Oligoclonal, different epitopes	Polyclonal, one domain immunodominant	Polyclonal, different epitopes
Class of antibody	Mainly IgG1, other subclasses to low extent	IgG1, IgG4 > IgG2, IgG3; low levels of IgA	IgG1, IgG4 > IgG2, IgG3; low levels of IgA and IgM (healthy individuals)
Action on neonate	Transplacental passage; transient hyperthyroidism or hypothyroidism with delayed development of thyroid gland	Transplacental passage; potential effects on cognitive development	Transplacental passage; potential effects on cognitive development
Prevalence in AITD	~90% GD; ~10% HT	>80% in GD and HT	>50% in GD and HT
Prevalence in other AD	Usually no expression, one study 18% in T1DM	16–37% RA; 40% T1DM; 12–30% CD	12–23% RA; 30% T1DM; 11–32% CD
Action of antibodies	Stimulating, blocking, apoptosis	Little action <i>per se</i>	No defined action
Extra-thyroidal targets	Few, defined effects (GO, GDP), partly known mechanism	Several, ill-defined actions (HE, breast cancer), mechanism of action not known	No specific targets identified
Action in breast cancer progression	No protective effect	Potential protective effects	Potential protective effects

TSHR, thyroid-stimulating hormone receptor; TPO, thyroid peroxidase; Tg, thyroglobulin; CD, celiac disease; GD, Graves' disease; GDP, Graves' dermopathy; GO, Graves' orbitopathy; HT, Hashimoto's thyroiditis; RA, rheumatoid arthritis; T1DM, type 1 diabetes mellitus; AITD, autoimmune thyroid disease; AD, autoimmune diseases; HE, Hashimoto's encephalopathy.

Hashimoto's Thyroiditis Histology



Risk Factors for Auto-Immune Thyroid Disorders (AITDs)



Automated
Immunoassay System



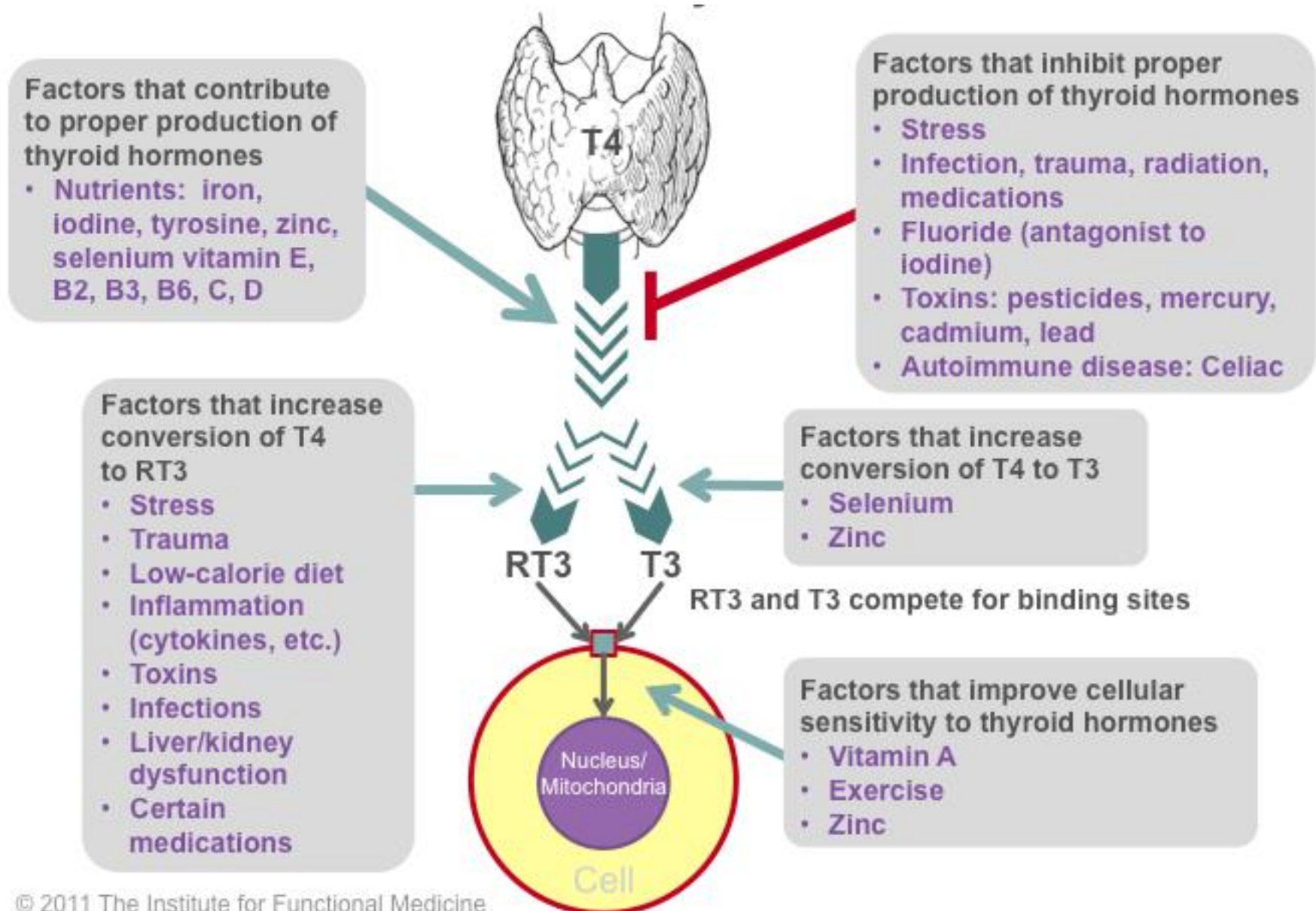
Electro-chemiluminescence
Immunoassay (ECLIA) System



Clinical & Research
Microscopes



Factors affecting Thyroid Function



Thyroiditis



GeneStar-96 Real-Time
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- Compact & High throughput
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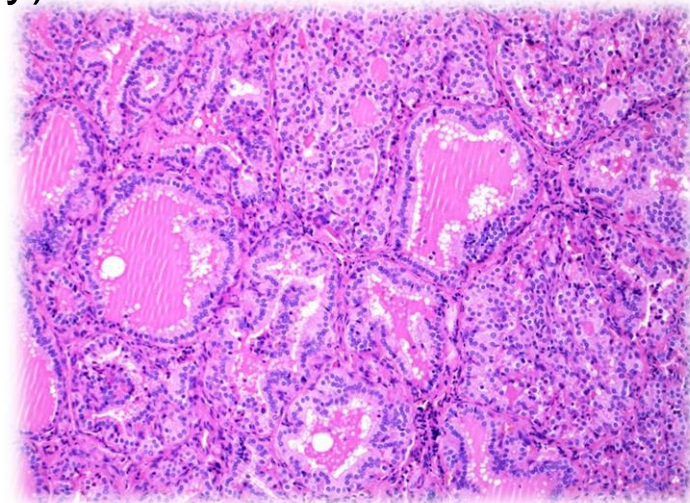
Hurricane
POCT Immunoassay System



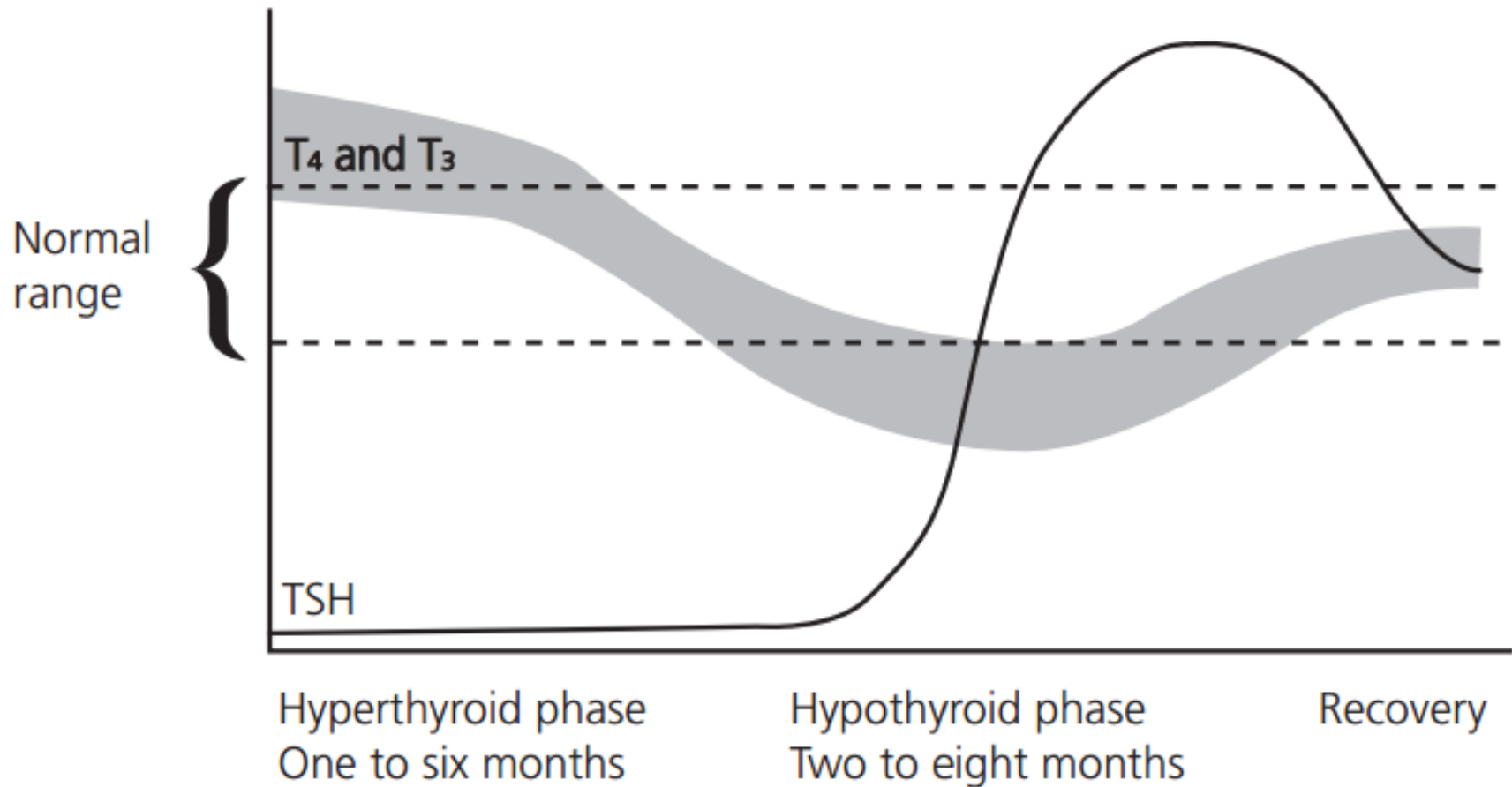
شرکت بنیان درمان
تلفن: ۰۳۰۰۵۰۰۸۸۷۰ (خط ۱۰)

Thyroiditis Classification

- Autoimmune thyroiditis
- Painless subacute thyroiditis, including postpartum
- Painful subacute thyroiditis
- Acute infectious thyroiditis (bacterial, viral)
- Chronic infectious thyroiditis (tuberculosis, syphilis)
- Sarcoidosis
- Granulomatous (De Quervain's thyroiditis)
- Riedel thyroiditis (fibrosing)
- Postirradiation (^{131}I or external-beam therapy)
- Drug-Induced thyroiditis



TFTs Time Courses in Thyroiditis



Post-Partum Thyroiditis (PPT)

Definition

- A painless autoimmune inflammation of thyroid tissue after delivery in a previously euthyroid woman

Prevalence

- 5-10 % of all Pregnancies

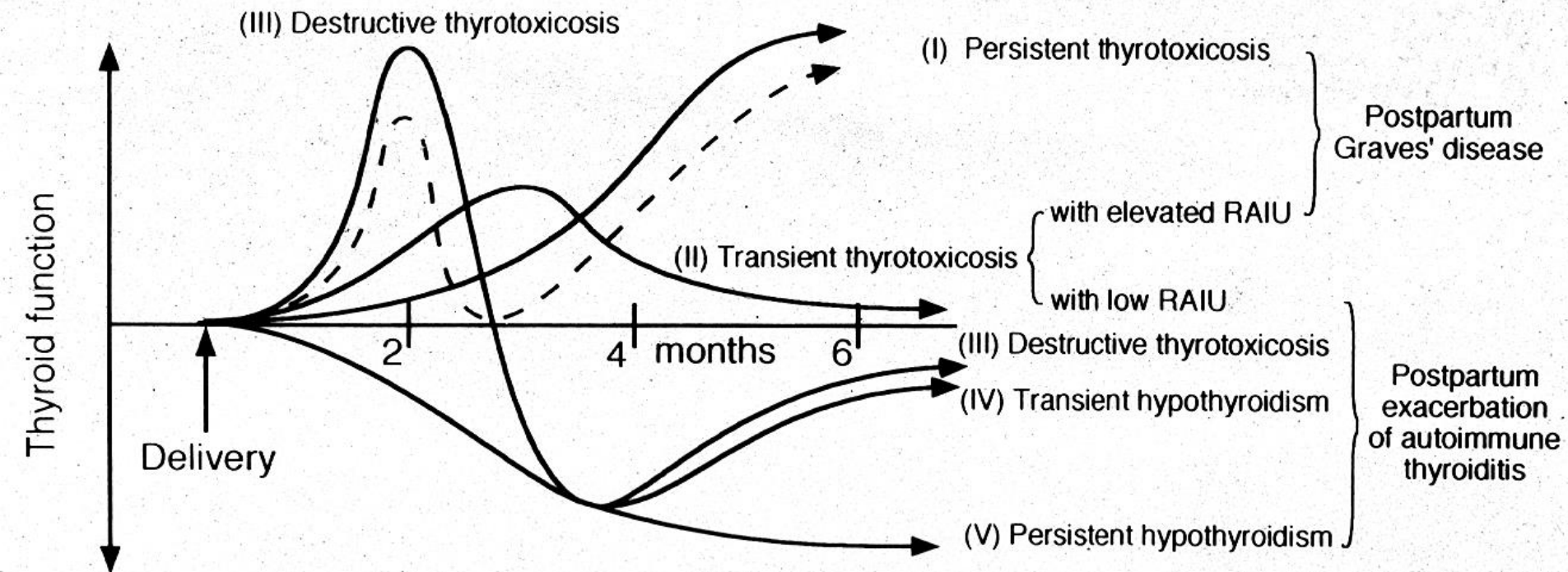
Risk Factors

- Anti-TPO⁺: 50%
- Patients with type 1 diabetes: 25%
- Previous history of PPT or other autoimmune disease such as Hashimoto's disease and Graves' disease

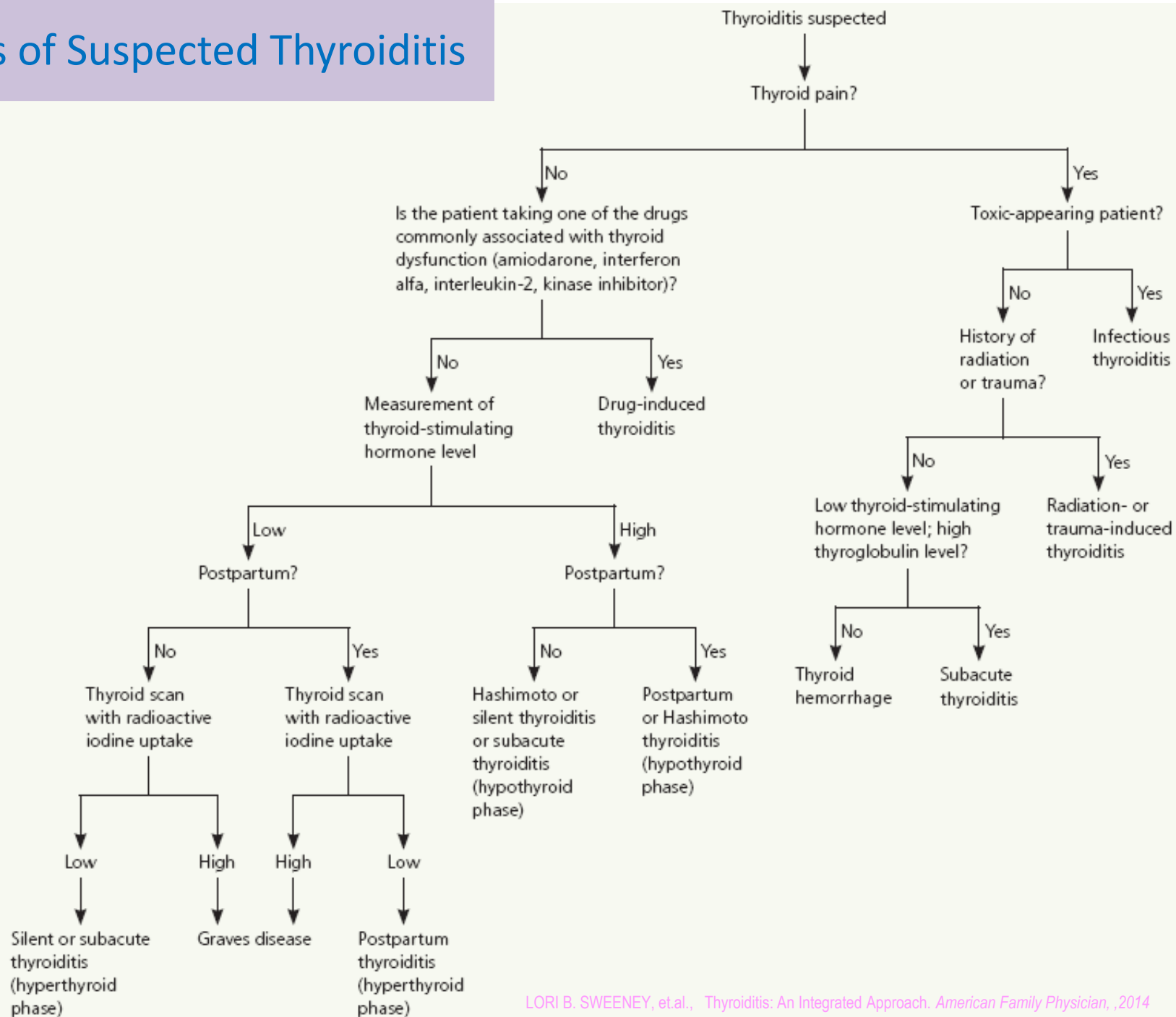
Presentation

- Transient Hyper.
- Transient Hypo
- Transient Hyper. then Transient Hypo. then Recovery


Post-Partum Thyroiditis (PPT)



Diagnosis of Suspected Thyroiditis




Laboratory evaluation of patients with suspected hypothyroidism



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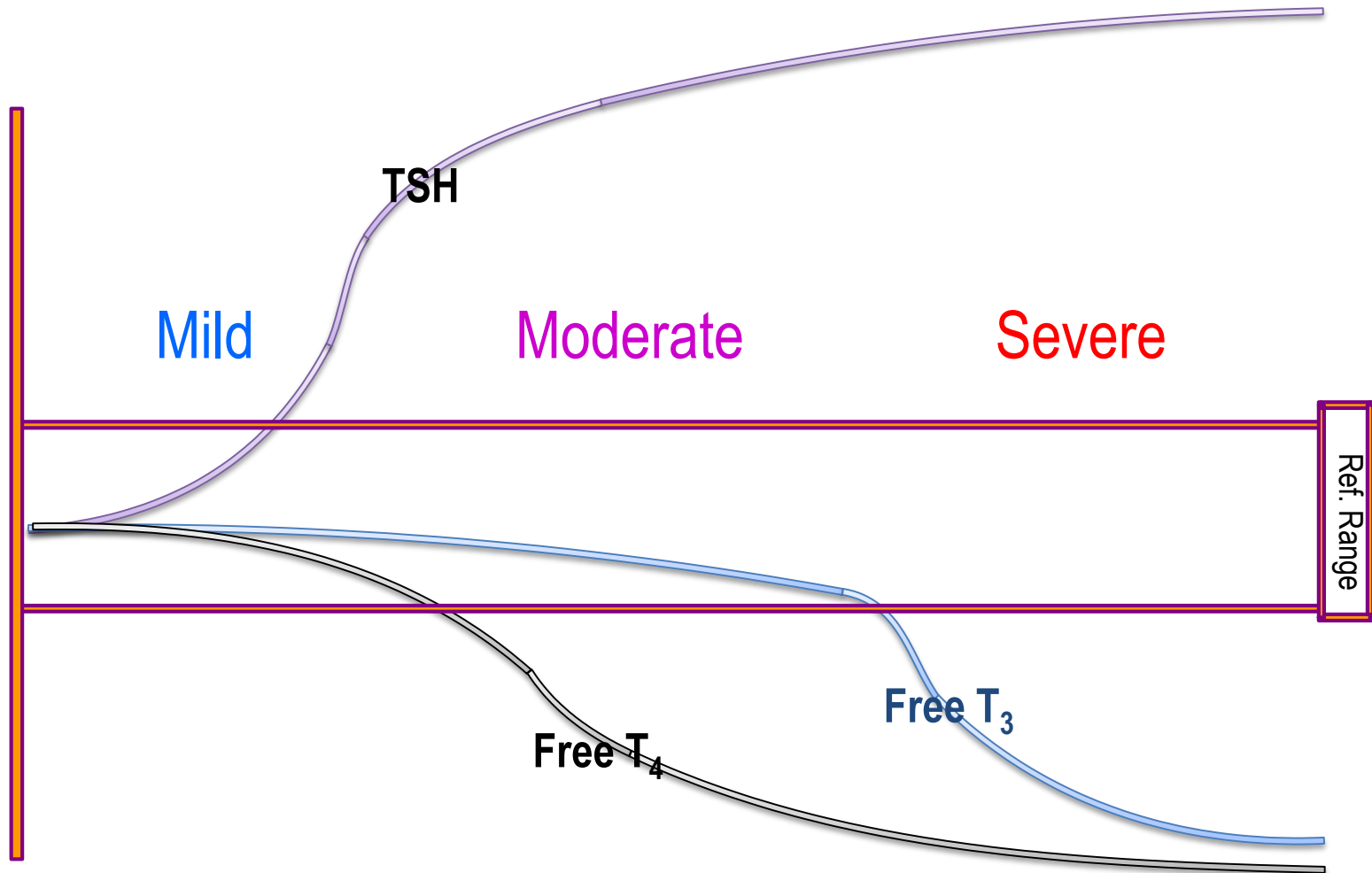


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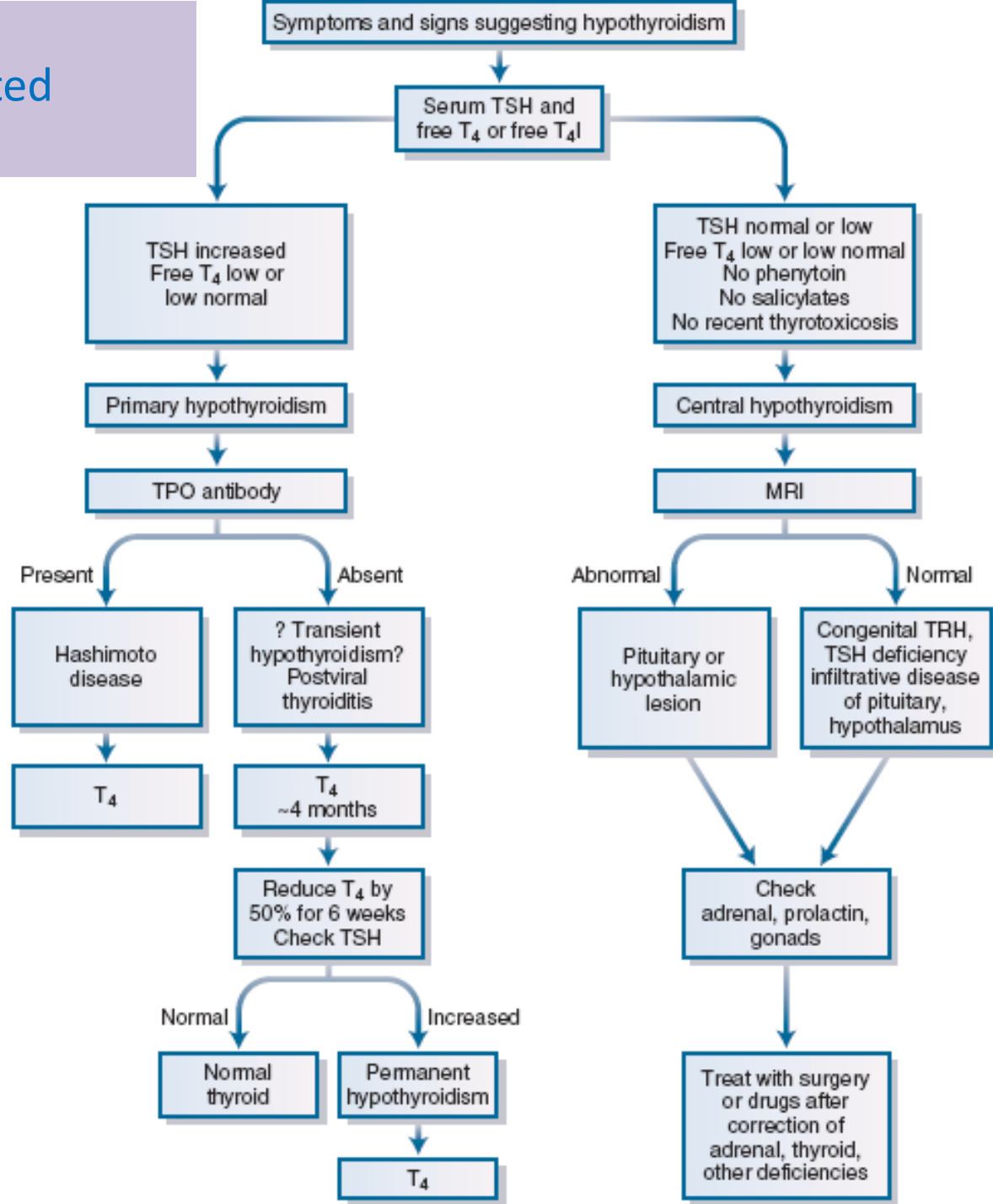
- ANA
- ds DNA
- CA 125
- CCP
- AMH
- CA 19-9
- PTH
- Folate
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TFTs in Progressive Hypothyroidism



William's Endocrinology, 2016



فریور ۴۰ - درجه سانتیگراد صندوقی

- به این جهت، سازمان توسعه و همکاری های اقتصادی و
 همکاری های منطقه ای (ا.ت.ه.ا.م) با همکاری وزارت
 معادن و صنایع معدنی ایران، اقدام به تشکیل
 «گروه مشترک منطقه ای برای بررسی و ارزیابی
 ذخایر مشترک منطقه ای» کرده است. این گروه
 مشترک، در سال ۱۳۸۲، با همکاری سازمان
 توسعه و همکاری های اقتصادی و همکاری های
 منطقه ای (ا.ت.ه.ا.م) و وزارت معادن و صنایع
 معدنی ایران، اقدام به تشکیل «گروه مشترک
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 (ا.ت.ه.ا.م) و وزارت معادن و صنایع معدنی
 ایران، اقدام به تشکیل «گروه مشترک منطقه
 ای برای بررسی و ارزیابی ذخایر مشترک منطقه
 ای» کرده است.

ژال تجهیز

Abstract

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ISO 9001:2008

Diagnosis and treatment of primary hypothyroidism

Suspected hypothyroidism

- Measure TSH. Measure free thyroxine if TSH elevated or if suspicion of disorders other than primary hypothyroidism
- Diagnosis based on two measurements

Indication for treatment

- Treat with 1.5–1.8 µg per kg of levothyroxine and initiate with full dose
- Start with 12.5–25.0 µg per day of levothyroxine in patients with cardiac symptoms and elderly patients with many comorbidities
- Inform women of childbearing age about the 30% increase in dose required once pregnant
- Repeat TSH measurement after 4–12 weeks and then every 6 months when stable

Treatment targets not reached

- Consider reasons for treatment failure

Treatment targets reached

- Annual serum TSH measurement

FT4(↓) and TSH (↑) (Hypothyroidism)

Common

- Chronic autoimmune thyroiditis (Hashimoto)
- Post radioiodine Therapy
- Post thyroidectomy
- Hypothyroid phase of transient thyroiditis

Rare (anti-TPO negative, no radioiodine or surgery)

- Post external-beam irradiation to the neck
- Drugs: amiodarone, lithium, interferons, interleukin-2

Iodine deficiency

- Iodine excess-iodide goitre in Japan (water purification units)
- Goitrogens
- Amyloid goitre (large, firm goitre with systemic amyloidosis)
- Riedel's thyroiditis†

Congenital—thyroid tissue absent

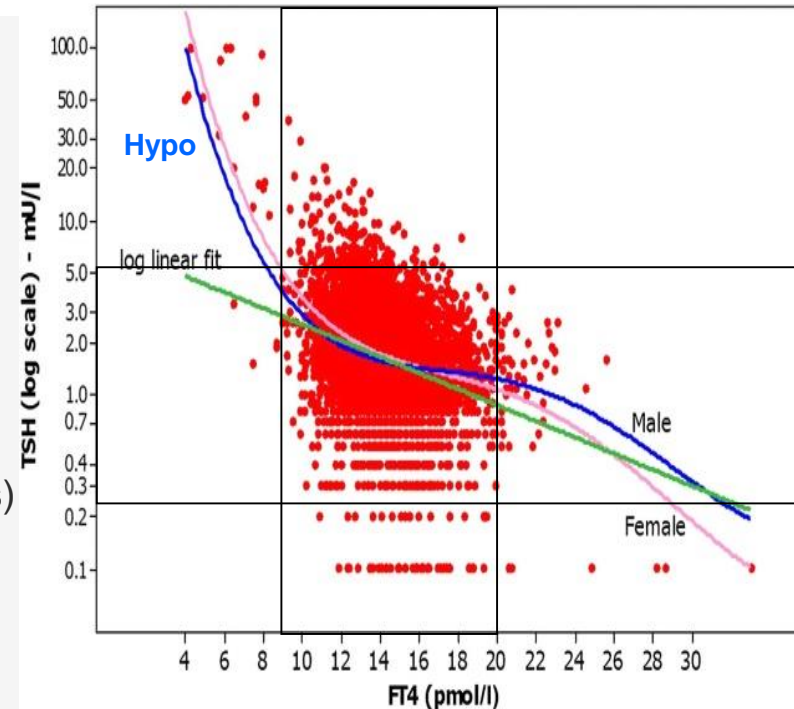
Thyroid dysgenesis possibly associated with TSH-receptor, *PAX-8*, and *TTF2* mutations

Congenital—thyroid tissue present

- Iodine transport defects—low radioiodine uptake or saliva iodine
- Iodine organification defect

Congenital-high radioiodine uptake, positive perchlorate discharge

- Thyroglobulin synthetic defect—low thyroglobulin concentration
- TSH-receptor defects
- Resistance to TSH with other (unspecified) defects



SUBCLINICAL THYROID DYSFUNCTION

(DEFINITIONS)

Subclinical hypothyroidism

= increased serum TSH but normal serum FT4

Subclinical hyperthyroidism

= decreased serum TSH but normal serum FT4 and FT3

FT4 (\leftrightarrow) and TSH (\uparrow)

(Zone 2)

Common

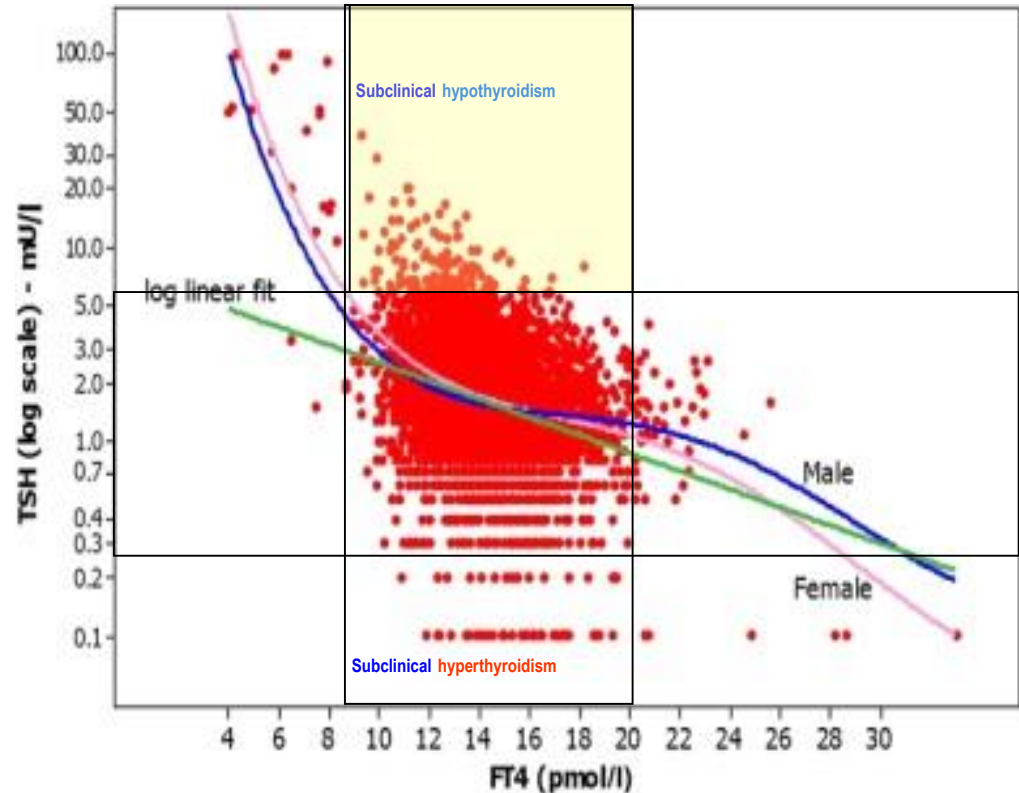
- Subclinical Hypothyroidism

Rare

- Heterophile (interfering) antibody
- Poor compliance with thyroxine
- Malabsorption of thyroxine
- Drugs (e.g. amiodarone, sertraline, cholestyramine)
- NTI recovery phase

Congenital

- TSH-receptor defects
- Resistance to TSH associated with other (unspecified) defects
- Pendred's syndrome—some cases (associated with sensorineural deafness and goitre)]



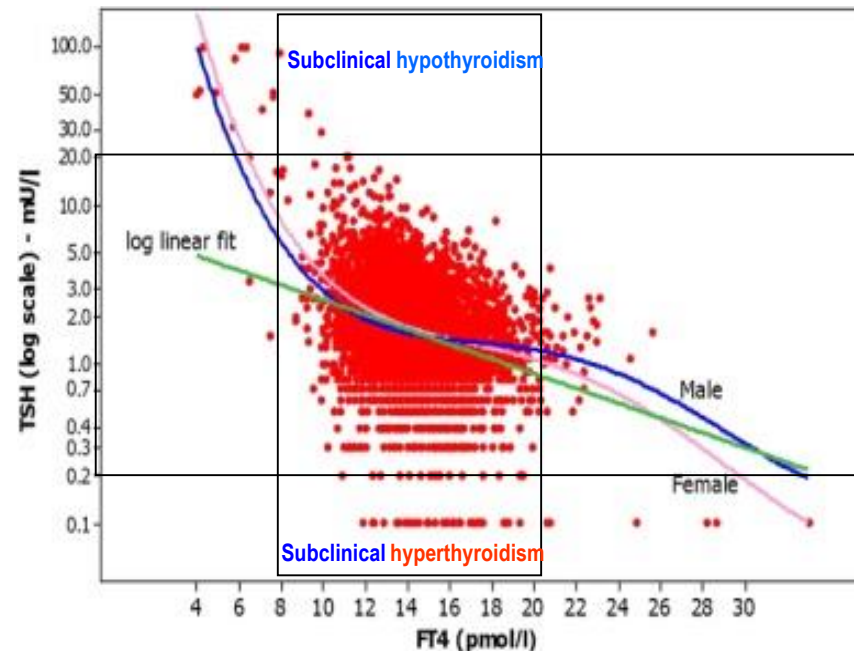
Importance of Subclinical Thyroid Dysfunction

Subclinical Hypothyroidism (Mild thyroid failure) (\uparrow TSH, \leftrightarrow FT4)

- Non specific symptoms may improve with treatment
- Progression to overt hypothyroidism (\sim 5% per year)
- Adverse effect on foetal brain development in pregnancy
- Adverse effects on vascular compliance
- Independent risk factor for atherosclerotic disease?
- Beneficial effect of treatment on lipids?

Subclinical Hyperthyroidism (\downarrow TSH, \leftrightarrow FT4, FT3)

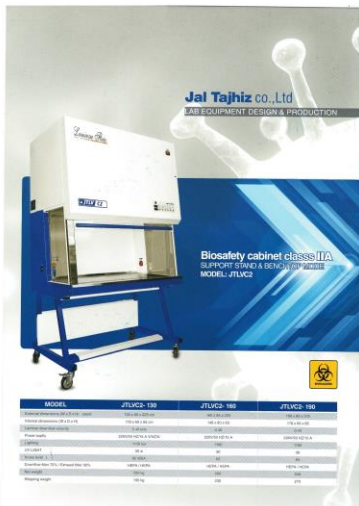
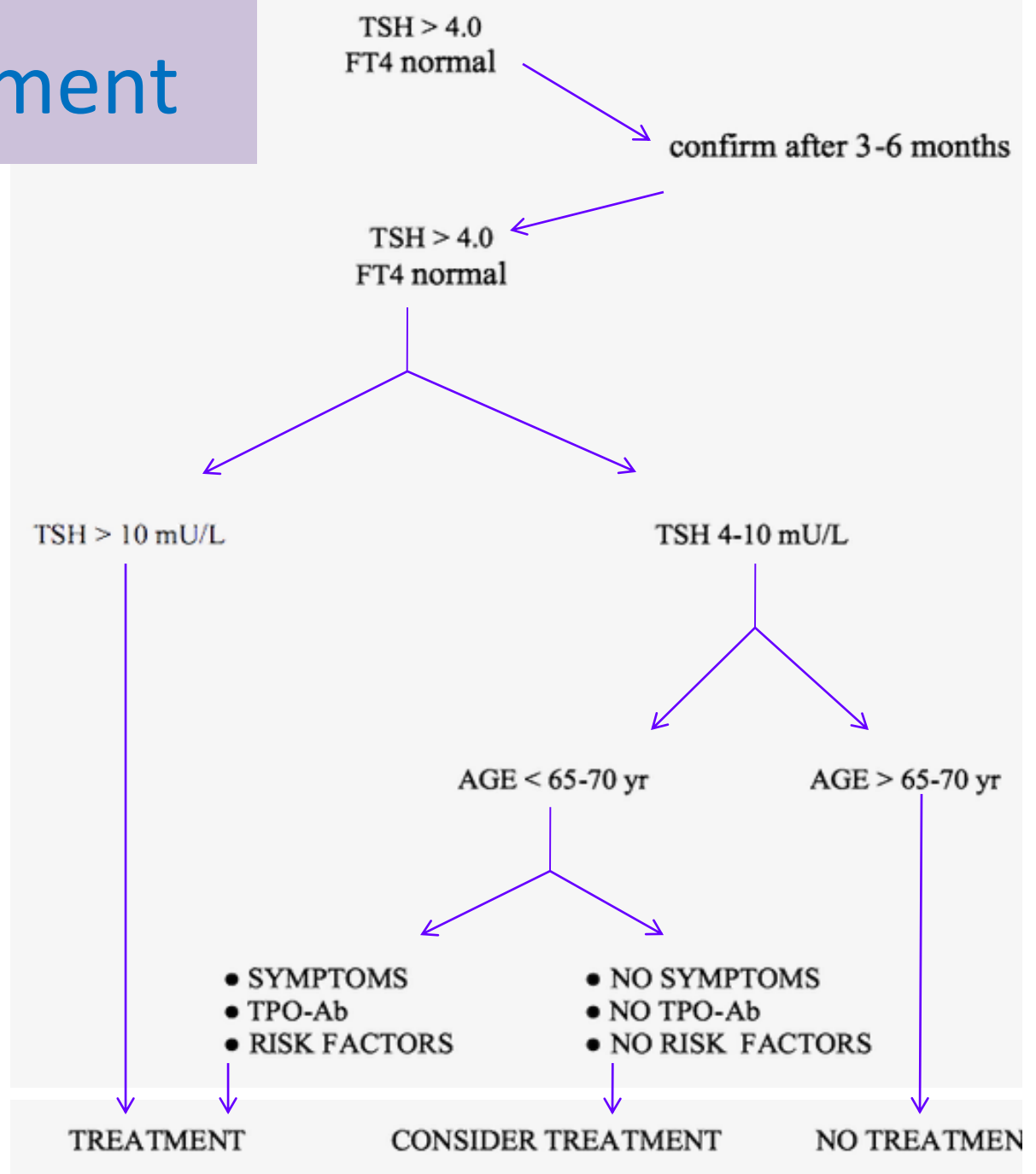
- Progression to overt thyrotoxicosis
- Exposure to iodine may precipitate severe thyrotoxicosis
- Threefold increased risk of atrial fibrillation after 10 years
- Osteoporosis & Bone Fractures risk increased
- Increased risk of Heart failure and Stroke



SCH Manifestations

Symptoms	<ul style="list-style-type: none">• hypothyroid symptoms• impaired well-being and quality of life• impaired cognitive functions (working memory)• mood disturbances
Signs	<ul style="list-style-type: none">• impaired left ventricle diastolic and systolic function• hypertension• ↑ systemic vascular resistance• ↑ central arterial stiffness• impaired endothelium function• ↑ carotid intima-media thickness• impaired muscle energy metabolism• impaired peripheral nerve conduction latency and amplitude• impaired stapedial reflex
Biochemistry	<ul style="list-style-type: none">• ↑ serum total and LDL cholesterol• ↑ HOMA index (insulin resistance)• ↑ serum C-reactive protein• ↓ factor VIIa• ↑ serum lactate during exercise• ↓ serum IGF-1,• ↑ serum leptin

SCH Management



Hypothyroidism Drug Therapy



Many Causes, One Treatment

- Treatment of choice is **Levothyroxin**
- Branded thyroxine recommended ?
- Brand consistency recommended
- No divided doses - illogical
- **Not recommended** for use :
 - Desiccated thyroid extract
 - Combination of thyroid hormones
 - **T₃** replacement except in Myxedema coma

Conditions That Alter Levothyroxine Requirements



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با مجوز از وزارت بهداشت درمان و آموزش پزشکی و وزارت صنایع و معادن استان تهران

Increased Levothyroxine Requirements

Pregnancy

Gastrointestinal Disorders

Mucosal diseases of the small bowel (e.g., sprue)
After jejunioileal bypass and small bowel resection
Impaired gastric acid secretion (e.g., atrophic gastritis)
Diabetic diarrhea

Therapy With Certain Pharmacologic Agents

Drugs That Interfere With Levothyroxine Absorption

Cholestyramine
Sucralfate
Aluminum hydroxide
Calcium carbonate
Ferrous sulfate

Drugs That Increase the Cytochrome P450 Enzyme (CYP3A4)

Rifampin
Carbamazepine
Estrogen
Phenytoin
Sertraline
? Statins

Drugs That Block T_4 to T_3 Conversion

Amiodarone

Conditions That May Block Deiodinase Synthesis

Selenium deficiency
Cirrhosis

Decreased Levothyroxine Requirements

Aging (≥ 65 years)
Androgen therapy in women

Drug Interactions

- Malabsorption Syndromes
- Reduced Absorption
 - Cholestyramine resin
 - Sucralfate
 - Ferrous sulfate
 - Soybean formula
 - Aluminum hydroxide
 - Colestipol hydrochloride
- Drugs that affect metabolism
 - Rifampin
 - Carbamazepine
 - Phenytoin
 - Phenobarbitol
 - Amiodarone



Automated
Immunoassay System



Electro-chemiluminescence
Immunoassay (ECLIA) System



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Clinical & Research
Microscopes



Dosage Adjustments

- Age (in elderly start with half dose)
- Severity and duration of hypothyroidism (↑ dose)
- Weight ($0.5\mu\text{g/kg/day}$ ↑ upto $3.0\mu\text{g/kg/day}$)
- Malabsorption (requires ↑ dose)
- Concomitant drug therapy (only on empty stomach)
- Pregnancy (25% ↑ in dose), safe in lactating mother
- Presence of cardiac disease (start alt. day Rx)

Start Low and Go Slow

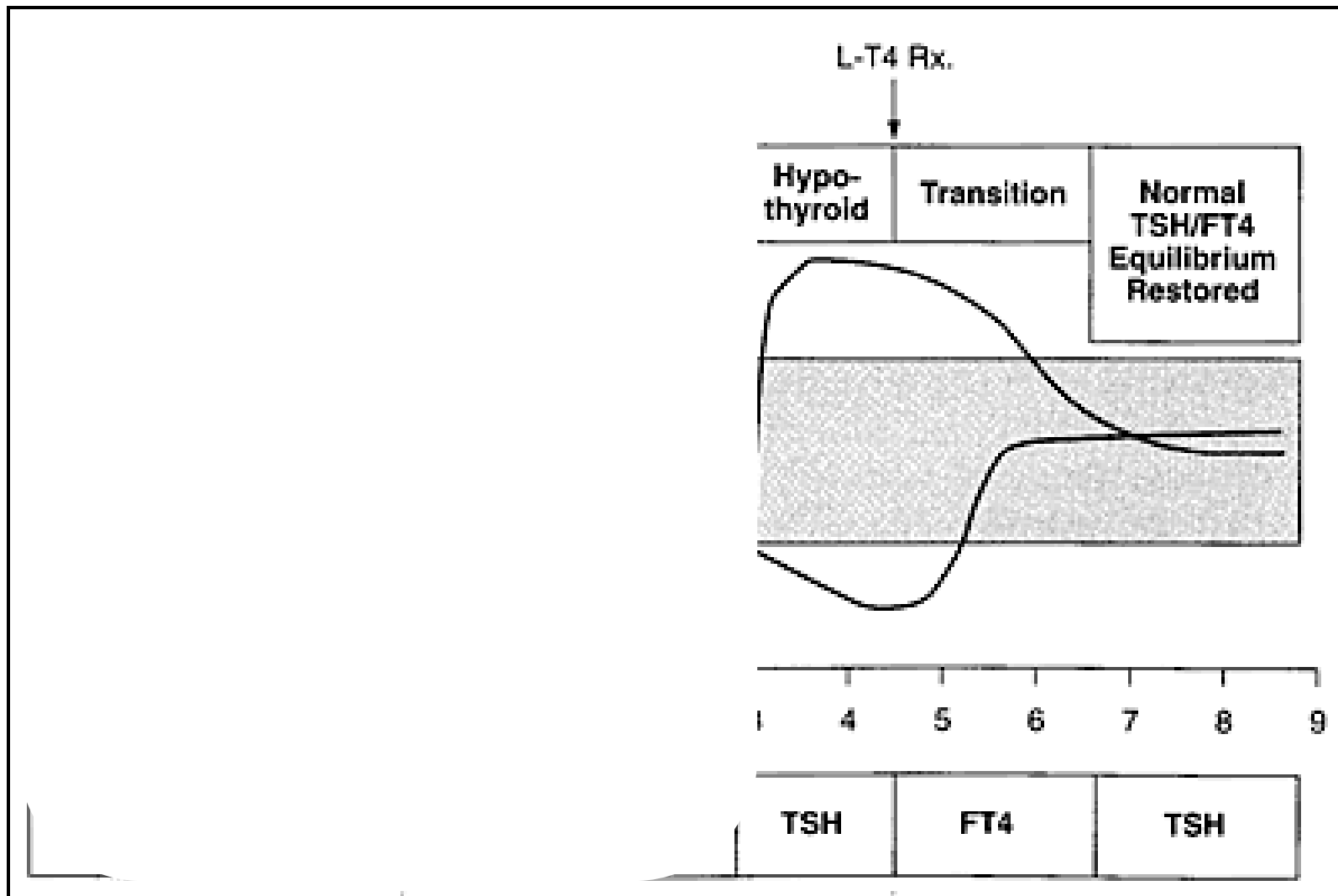
- **Goal** : normalize TSH level – 25, 50 and 100 mcg tablets avail.
- Starting dose for **patients < 50 years** at 1.0 µg/kg/day
- Starting dose for **patients > 50 years** should be < 50 µg/day. Dose ↑ by 25 µg, if needed, at 6 to 8 weeks intervals.
- Starting dose for patients with **heart disease** should be 12.5 to 25 µg/day and increase by 12.5 to 25 µg/day, if needed, at 6 to 8 weeks intervals

How the patient improves

- Feels better in 2 – 3 weeks
- Reduction in weight is the first improvement
- Facial puffiness then starts coming down
- Skin changes, hair changes take long time to regress
- TSH starts showing decrements from the high values
- TSH returns to normal eventually



Concept of Steady State Conditions & Treatment



Inappropriate Dosage

Over-replacement risks

- Reduced bone density / osteoporosis
- Tachycardia, arrhythmia. atrial fibrillation
- In elderly or patients with heart disease, angina, arrhythmia, or myocardial infarction²

Under-replacement risks

- Continued hypothyroid state
- Long-term end-organ effects of hypothyroidism
- Increased risk of hyperlipidemia

Diet in Iodine deficiency

- Iodized salt
- Selenium supplementation
- Fish, meat, milk & eggs
- Avoid:
 - Cassava
 - Cabbage (goitrogens)
 - Formula milk



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Myxedema Coma

- Precipitating factors :
 - Infection, trauma, stroke, cardiovascular, hemorrhage drug overdose, diuretics
- Signs and Symptoms :
 - Mental confusion, hypothermia, bradycardia, older age,
 - ↓ Na, ↓ glucose, ↑ CO₂, ↓ WBC, ↓ Hct, ↑ CPK
 - ↓ EKG voltage, myxedema, b-carotnenemia
- Treatment
 - ICU transfer,
 - T₃ 100 µg IV sixth hourly,
 - 500 µg of T₄
 - antibiotics,
 - ventilation,
 - hydrocortisone IV,
 - passive warming,
 - careful volume management

[illegible]

Case Studies



Automated
Immunoassay System



Electro-chemiluminescence
Immunoassay (ECLIA) System



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• CA 125 • CA 19-9 • CA 15-3

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Case Study #1

History: A 50 year old housewife complains of progressive weight gain of 9 Kg in 1 year, fatigue, slight memory loss, slow speech, dry skin, constipation, and cold intolerance.

Physical examination:

- Vital signs include: $t = 37.1^{\circ}\text{C}$, PR= 58/min and, BP 140/100.
- She is moderately obese and speaks slowly and has a puffy face, with pale, cool, dry, and thick skin.
- The thyroid gland is slightly enlarged, firm, not nodular, mobile, and not tender.
- The deep tendon reflex time is delayed.

Laboratory studies:

- | | | |
|--------------------------|-----------------------|------------|
| • CBC & differential WBC | normal | |
| • TT4 | 3.8 $\mu\text{g/dl}$ | (4.5-12.5) |
| • TSH | 23.0 $\mu\text{U/ml}$ | (0.2-3.5), |
| • Cholesterol | 255 mg/dl | (<200). |

What is the likely diagnosis?

- Primary hypothyroidism

What are the most likely causes?

- Autoimmune thyroid disease (Hashimoto's thyroiditis)
- Iodine Deficiency
- Radioactive iodine therapy for hyperthyroidism
- Thyroidectomy
- External beam radiotherapy

Case Study #2

History: A 50 year old housewife complains of progressive weight gain of 9 Kg in 1 year, fatigue, postural dizziness, memory loss, slow speech, deepening of voice, dry skin, constipation, and cold intolerance.

Physical examination:

- Vital signs include $t = 36^{\circ}\text{C}$, PR= 58/min and, BP 110/60.
- She is moderately obese and speaks slowly and has a puffy face, with pale, cool, dry, and thick skin.
- The thyroid gland is not palpable,
- The deep tendon reflex time is delayed.

Laboratory studies:

- | | |
|--------------------------|------------------------|
| • CBC & differential WBC | normal |
| • TT4 | 3.8 $\mu\text{g/dl}$, |
| • TSH | 1 $\mu\text{U/ml}$, |
| • Cholesterol | 255 mg/dl. |

What is the likely diagnosis?

- Secondary hypothyroidism
- Tertiary hypothyroidism (less likely)

What is the next step?

- Imaging

What are the most likely causes?

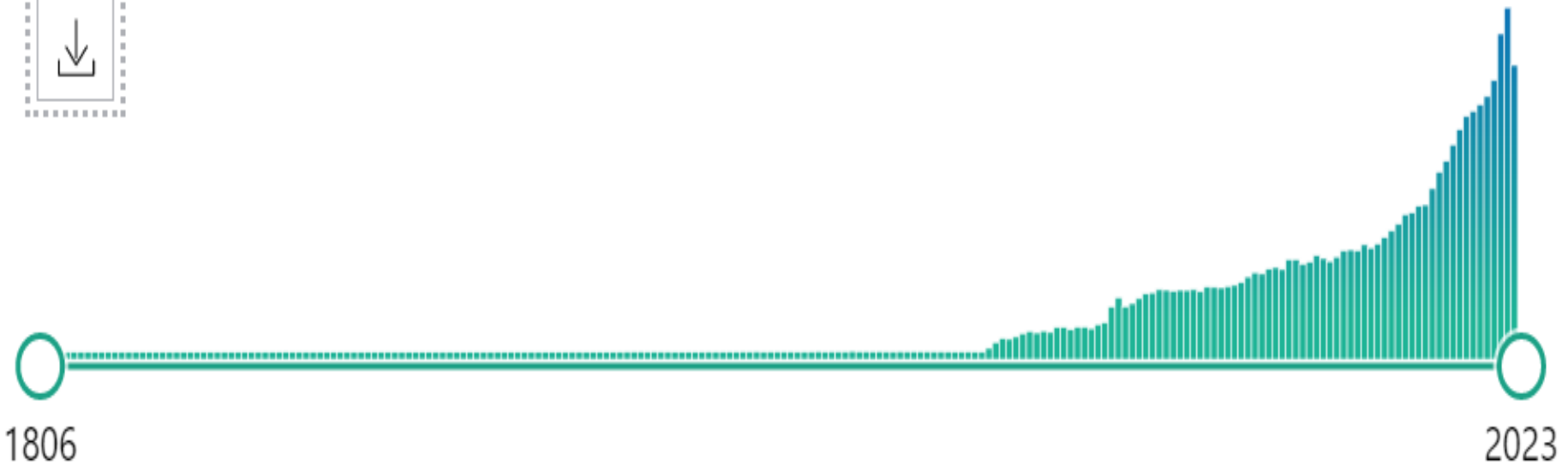
- Pituitary tumor
- Pituitary infarction
- Sarcoidosis,
- Histiocytosis X,
- Hemochromatosis,
- Metastatic carcinoma involving pituitary, hypothalamus or stalk,
- Rathke's cleft cyst,
- Craniopharyngioma,
- Carotid artery aneurysm compressing pituitary, infundibuloma,
- Hypothalamic tumor (germinoma, meningioma, hamartoma)

Thyroid Keyword in PubMed

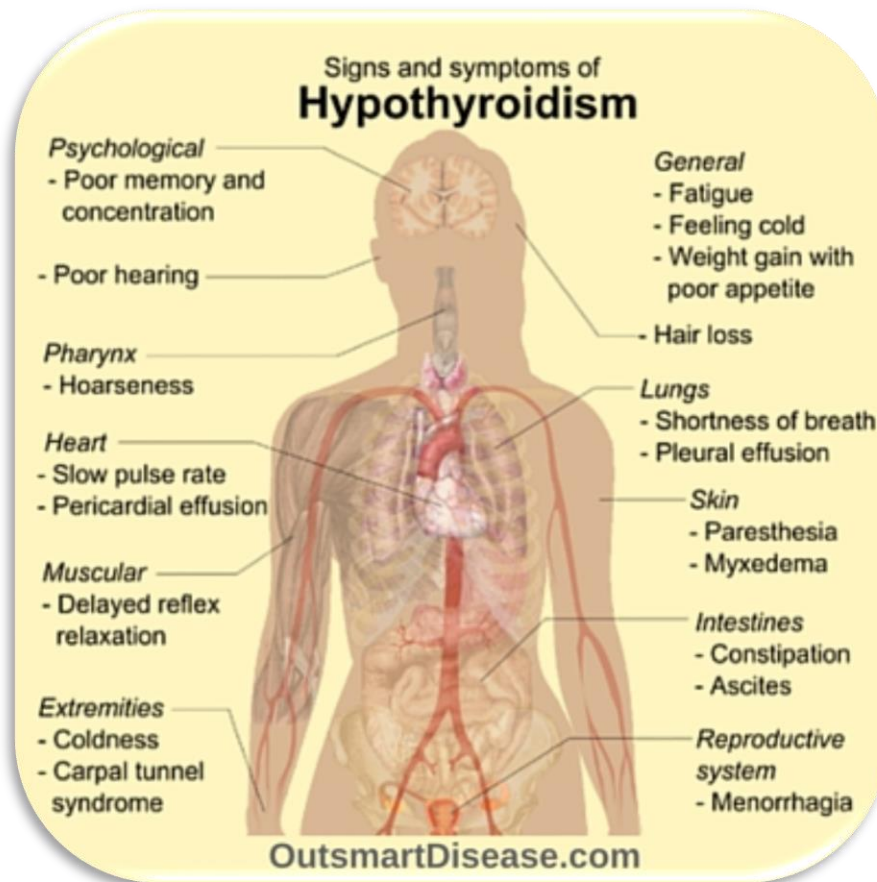
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247,497 results

« < Page 1 of 24,750 > »



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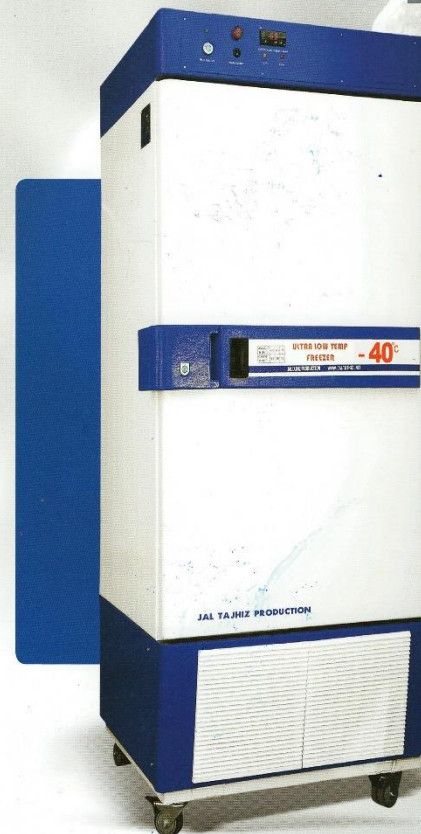
Hurricane

POCT Immunoassay System

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MODEL	JTFUL130	JTFUL280	JTFUL360
Capacity	130 L	280 L	360 L
External dimensions	150*55*70 cm	177*72*80 cm	200*72*80 cm
Internal dimensions	75*35*55 cm	96*52*55 cm	125*52*55 cm
Shelves	3	4	5

Magnüs *microscopes*

- Anti fungus optics
- Plan superior imaging
- Rackless stage for durability and ease of use
- Ergonomic and compact design for user convenience
- Aspheric light relay system for bright and uniform illumination



MX21i CLINICAL MICROSCOPE

Optional Accessories



Dual Filter
(B&G)



Trinocular Head With
USB Digital Camera

شرکت بنیان درمان
تلفن: ۸۸۷.۳۰۵۰ (خط ۱۰)

Hipro®



Automated
Immunoassay System

شرکت بنیان درمان
تلفن: ۸۸۷.۳۰۵۰ (خط ۱۰)

Lifotronic



Electro-chemiluminescence
Immunoassay (ECLIA) System

Magnüs



Clinical & Research
Microscopes



ژال تجهیز

JAL TAJHIZ MEHRAN
LAB EQUIPMENT DESIGN & PRODUCTION



JAL TAJHIZ MEHRAN
WWW.JALTAJHIZCO.COM
(دانش بنیان)

(طراحی - مشاوره - اجرا و ساخت تجهیزات آزمایشگاهی و تحقیقاتی)
با مجوز از وزارت بهداشت درمان و آموزش پزشکی و وزارت صنایع و معادن استان تهران

Products	Thyroid Panel	T3 (96)	Tumor Markers	*PSA (96)
		T3 (192)		*Free PSA (96)
		T4 (96)		*CEA (96)
		T4 (192)		*AFP (96)
		*TSH (96)		*CA 125 (96)
		*TSH (192)		*CA 19-9 (96)
		Free T3 (96)		*CA 15-3 (96)
		Free T4 (96)		*DHEA-S (96)
		T-Uptake (96)		*17OH-Progesterone (96)
		*Anti-TPO		*E2 Estradiol (96)
	Infectious Diseases	*Anti-H-pylori-IgA (96)	Steroids Panel	*Testosterone (96)
		*Anti-H-pylori-IgM (96)		*Progesterone (96)
		*Anti-H-pylori-IgG (96)		*Cortisol (96)
	Rheumatology	ANA (96)	Vitamin D	*Free Testosterone
		Anti-ds DNA (96)		25-Hydroxy Vitamin D (96)
		CCP (96)		25-Hydroxy Vitamin D (192)
	Anemia	*Ferritin (96)	Allergy	*IgE (96)
		*Ferritin (192)		SARS-COV-2 IgG
		*Vitamin B12 (96)	SARS-COV-2	SARS-COV-2 IgM Capture (96)
		*Folate (96)		SARS-COV-2 Antigen Rapid

* تکمیل کننده پلایت استریتو اویدین - بیوتین

Growth Hormone	*GH (96)
ParaThyroid Hormone	*PTH (96)
Fertility Panel	*LH (96)
	*FSH (96)
	*PRL (96)
	*hCG Titr (96)
	hCG (96) Rapid
	hCG (192) Rapid
	AMH (96)

NEW Kits

Rheumatology	ANA (96)
	Anti-ds DNA (96)
	CCP (96)
Tumor Markers	*CA 125
	*CA 19-9
	*CA 15-3
Fertility	AMH
Anemia	Folate
Miscellaneous	PTH

* تکمیل کننده پلایت استریتو اویدین - بیوتین



ژال تجهیز



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با مجوز از وزارت بهداشت درمان و آموزش پزشکی و وزارت صنایع و معادن استان تهران

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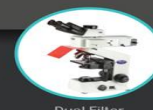
Magnus microscopes

MX21i
CLINICAL MICROSCOPE



- Anti fungus optics
- Plan superior imaging
- Rackless stage for durability and ease of use
- Ergonomic and compact design for user convenience
- Aspheric light relay system for bright and uniform illumination

Optional Accessories



Dual Filter (B&O)



Trinocular Head With USB Digital Camera

ردیف	تاریخ	نحوه برگزاری	مبحث	نام استاد	امتیاز بازآموزی
۱	۱۴۰۱/۱۰/۰۲	آنلاین - حضوری	سل کانترهای پیشرفته	دکتر نادر وظیفه شیران	✓
۲	۱۴۰۱/۱۰/۰۶	آنلاین - حضوری	مدیریت ریسک و مدیریت هزینه	دکتر مهرداد ونکی	✓
۳	۱۴۰۱/۱۰/۱۵	آنلاین - حضوری	تیروئید شناسی	دکتر محمدرضا بختیاری	✓
۴	۱۴۰۱/۱۰/۱۶	آنلاین - حضوری	تیروئید شناسی	دکتر محمدرضا بختیاری	✓
۵	۱۴۰۱/۱۰/۲۲	آنلاین - حضوری	تیروئید شناسی	دکتر محمدرضا بختیاری	✓
۶	۱۴۰۱/۱۰/۲۳	آنلاین - حضوری	تیروئید شناسی	دکتر محمدرضا بختیاری	✓
۷	۱۴۰۱/۱۰/۲۹	آنلاین	کنترل کیفیت در آزمایش تعیین حساسیت ضد میکروبی (آنتی بیوگرام)	دکتر سید مهدی بوتراپی	✓
۸	۱۴۰۱/۱۱/۰۶	آنلاین	ایمونوپاتولوژی انواع هپاتیت های ویروسی و اتوایمون	دکتر بابک بلبلی	✓
۹	۱۴۰۱/۱۱/۰۷	آنلاین	اصول تفسیر و چالشهای آزمایشگاهی انواع هپاتیت ویروسی	دکتر بابک بلبلی	✓
۱۰	۱۴۰۱/۱۱/۰۸	آنلاین	کنترلی کیفیت ابزار پایه در بخش میکروب شناسی	سرکار خانم صبوریان	✓
۱۱	۱۴۰۱/۱۱/۰۹	آنلاین	کنترل کیفیت در بخش میکروب شناسی	سرکار خانم صبوریان	✓
۱۲	۱۴۰۱/۱۱/۱۱	آنلاین - حضوری	اصول مشتری مداری	مهندس بابکی	✗
۱۳	۱۴۰۱/۱۱/۱۲	آنلاین - حضوری	اصول مشتری مداری	مهندس بابکی	✗
۱۴	۱۴۰۱/۱۲/۰۴	آنلاین	جنبه های آزمایشگاهی هورمون رشد و پرولاکتین	دکتر رضا محمدی	✓
۱۵	۱۴۰۱/۱۲/۰۵	آنلاین	جنبه های آزمایشگاهی غدد فوق کلیوی	دکتر رضا محمدی	✓
۱۶	۱۴۰۱/۱۲/۱۱	آنلاین	جنبه های آزمایشگاهی غدد تیروئید	دکتر رضا محمدی	✓
۱۷	۱۴۰۱/۱۲/۱۲	آنلاین	جنبه های آزمایشگاهی غدد جنسی	دکتر رضا محمدی	✓



HP083/4-II

- 4 individual test channels
- Rapid whole blood test
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Products	Thyroid Panel	Tumor Markers	Steroids Panel	Vitamin D	Allergy	SARS-COV-2
Thyroid Panel	T3 (96)	PSA (96)	Anti-Hypocort (96)	25-Hydroxy Vitamin D (96)	Anti-ds DNA (96)	SARS-COV-2, Antigen Rapid
	T3 (192)	Free PSA (96)	Anti-Hypocort-IgA (96)	25-Hydroxy Vitamin D (192)	Anti-ds DNA (192)	SARS-COV-2, Antigen Rapid
	T4 (96)	CEA (96)	Anti-Hypocort-IgG (96)	CDP (96)	Ferritin (96)	SARS-COV-2, Antigen Rapid
	T4 (192)	AFP (96)	Anti-Hypocort-IgA (96)	CDP (96)	Ferritin (192)	SARS-COV-2, Antigen Rapid
Infectious Diseases	TSH (96)	CA 125 (96)	Anti-Hypocort-IgA (96)	CDP (96)	Ferritin (96)	SARS-COV-2, Antigen Rapid
	TSH (192)	CA 19-9 (96)	Anti-Hypocort-IgA (96)	CDP (96)	Ferritin (192)	SARS-COV-2, Antigen Rapid
	Free T3 (96)	CA 15-3 (96)	Anti-Hypocort-IgA (96)	CDP (96)	Ferritin (96)	SARS-COV-2, Antigen Rapid
	Free T4 (96)	DHEA-S (96)	Anti-Hypocort-IgA (96)	CDP (96)	Ferritin (192)	SARS-COV-2, Antigen Rapid
Rheumatology	Triptoke (96)	17OH-Progesterone (96)	Anti-Hypocort-IgA (96)	CDP (96)	Ferritin (96)	SARS-COV-2, Antigen Rapid
	Anti-TPO	17B2 Estradiol (96)	Anti-Hypocort-IgA (96)	CDP (96)	Ferritin (192)	SARS-COV-2, Antigen Rapid
	Anti-Hypocort-IgA (96)	Testosterone (96)	Anti-Hypocort-IgA (96)	CDP (96)	Ferritin (96)	SARS-COV-2, Antigen Rapid
	Anti-Hypocort-IgG (96)	Progesterone (96)	Anti-Hypocort-IgA (96)	CDP (96)	Ferritin (192)	SARS-COV-2, Antigen Rapid
Anemia	AMA (96)	Free Testosterone	Anti-Hypocort-IgA (96)	CDP (96)	Ferritin (96)	SARS-COV-2, Antigen Rapid
	Anti-ds DNA (96)	25-Hydroxy Vitamin D (96)	Anti-Hypocort-IgA (96)	CDP (96)	Ferritin (192)	SARS-COV-2, Antigen Rapid
	CDP (96)	25-Hydroxy Vitamin D (192)	Anti-Hypocort-IgA (96)	CDP (96)	Ferritin (96)	SARS-COV-2, Antigen Rapid
	Ferritin (96)	CDP (96)	Anti-Hypocort-IgA (96)	CDP (96)	Ferritin (192)	SARS-COV-2, Antigen Rapid

Products	Growth Hormone	ParaThyroid Hormone	Fertility Panel
Products	%GH (96)	PTH (96)	%LH (96)
	%GH (192)	%LH (192)	%FSH (96)
	%FSH (96)	%FSH (192)	%LH (96)
	%FSH (192)	%FSH (96)	%LH (192)
NEW Kits	%FSH (96)	%FSH (192)	%LH (96)
	%FSH (192)	%FSH (96)	%LH (192)
	%FSH (96)	%FSH (192)	%LH (96)
	%FSH (192)	%FSH (96)	%LH (192)

Products	Rheumatology	Tumor Markers	Fertility	Anemia	Miscellaneous
Products	ANA (96)	CA 125 (96)	%LH (96)	Folate	PTH
	Anti-ds DNA (96)	CA 19-9 (96)	%LH (192)	Folate	PTH
	CCP (96)	CA 15-3 (96)	%LH (96)	Folate	PTH
	CCP (192)	CA 19-9 (192)	%LH (192)	Folate	PTH
NEW Kits	ANA (96)	CA 125 (96)	%LH (96)	Folate	PTH
	Anti-ds DNA (96)	CA 19-9 (96)	%LH (192)	Folate	PTH
	CCP (96)	CA 15-3 (96)	%LH (96)	Folate	PTH
	CCP (192)	CA 19-9 (192)	%LH (192)	Folate	PTH

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