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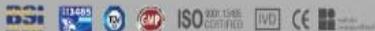


امتیازات پنل تیروئید نویان نگین پارسیان

-  به‌کارگیری تکنولوژی Ag Coating در تست های رقابتی
-  دارای برچسب اصالت کالا از اداره کل تجهیزات پزشکی
-  حجم برداشت یکسان سرم در تست های تیروئیدی
-  سوبسترا (محلول رنگزای) آماده استفاده صورتی رنگ
-  سوپر سنستیو بودن تست TSH



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ساختمان نویان نگین پارسیان

 www.nouyan-co.com

 NOUYAN_NEGIN_PARSIAN

 ۰۲۱-۴۹۳۷۵۰۰۰ (خط ویژه)

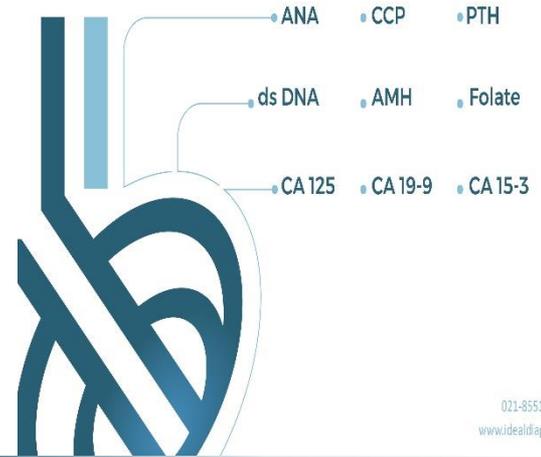
Products	Thyroid Panel	T3 (96)	Tumor Markers	*PSA (96)	* رکتوری پلٹ اسٹریو ٹیو وینڈس-ایف ۲۰۲۰
		T3 (192)		*Free PSA (96)	
		T4 (96)		*CEA (96)	
		T4 (192)		*AFP (96)	
		*TSH (96)		*CA 125 (96)	
		*TSH (192)		*CA 19-9 (96)	
	Free T3 (96)	*CA 15-3 (96)			
	Free T4 (96)	*DHEA-S (96)			
	T-uptake (96)	*17OH-Progesterone (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)	
	Anemia	CCP (96)	Allergy	25-Hydroxy Vitamin D (192)	
		*Ferritin (96)		*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			

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

NEW Kits

Rheumatology	ANA (96)	* رکتوری پلٹ اسٹریو ٹیو وینڈس-ایف ۲۰۲۰
	Anti-ds DNA (96)	
Tumor Markers	CCP (96)	
	*CA 125	
	*CA 19-9	
	*CA 15-3	
Fertility	AMH	
Anemia	Folate	
Miscellaneous	PTH	

NEW Kits



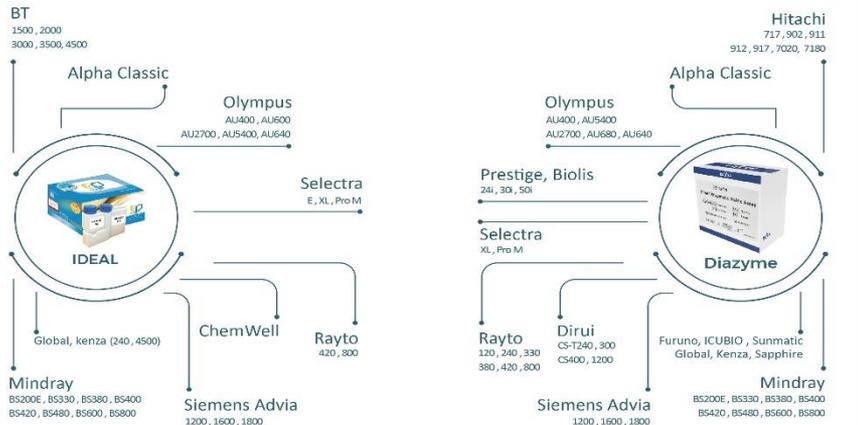
- ANA
 - ds DNA
 - CCP
 - AMH
 - Folate
 - PTH
 - CA 125
 - CA 19-9
 - CA 15-3
- NEW KITS**

تولید کننده

کیت های تشخیص طی الایزا



سامان
تجهیز
نور



- Tumor Markers
- Thyroid
- Gastroenterology
- Fertility
- Steroids
- Anemia
- Allergy
- Coagulation
- Vitamin D
- Thrombosis
- Rheumatology
- Vasculitis
- Infectious Diseases



Samantajhiz

- ANA
- ds DNA
- CCP
- AMH
- CA 19-9
- Folate
- CA 125
- PTH
- CA 15-3



NEW KITS

تولید کننده

• کیت‌های تشخیص طبی الایزا



ژال تجهیز



NEW Kits

- ANA
- ds DNA
- CA 125
- CCP
- AMH
- CA 19-9
- PTH
- Folate
- CA 15-3

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(دانش بنیان)

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LAB EQUIPMENT DESIGN & PRODUCTION

(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

eCL8000

Electro-chemiluminescence Immunoassay (ECLIA) System

ASSAY MENU

Infectious Disease

SARS-CoV-2 IgM
SARS-CoV-2 IgG

Thyroid Function

T4
T3
FT4
FT3
TSH
Tg
TBO
Anti-TPO
Anti-Tg

Bone Metabolism

ZON-VD
PTH
CT

Anemia

Folate
Ferritin

Fertility

E2
TESTO
PROG
HCG
FSH
LH
PRL

Hepatic Fibrosis

CS
LN
CV
FIBRP
HA

Glycometabolism

Insulin
C-peptide

Inflammation and Infection

PCP
CRP
IL6

Gastritis

PG I
PG II

Cardiac Markers

MPO
CK-MB
NT-proBNP
cTnl
D-dimer
H-FABP
Ip-PLA2
Cardiac Control

Specifications

Methodology	Electro-chemiluminescence Immunoassay (ECLIA)
Test Mode	Standard, STAT
Reagent Channels	10
Sample Positions	30
Sample Type	Serum, Plasma
Sample Volume	5 - 100 µL
Reaction Positions	100
Reaction Cups	Disposable
Throughput	86 T/Hour
Incubation Temperature	37±0.5°C
Reagent System	Liquid Level Detection; Refrigeration, 4 - 15°C;
System Reagent	Buffer and Auffer; Slot Temperature 28±2°C
Probe	Liquid Level Detection, Probe Crashing Protection, Probe Blocking Detection
Dimensions	650 mm×620 mm×650 mm (25.6" H x 24.4" W x 25.5" D)
Weight	92 kg (203lbs)



No. 502 and 504, Hegin Saei Building
Maz Saei Park, Val-Arj Avenue, Tehran
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eCL8000

Electro-chemiluminescence Immunoassay (ECLIA) System



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(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

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Thyroid Related Tests

M Reza Bakhtiari, DCLS, PhD



dr.bakhtiari.academy

Thyroid Lab Tests

Thyroid-related Laboratory tests can be divided into **five (5)** major categories:

- (1) Tests assessing Hypothalamus-Pituitary-Thyroid (**HPT**) **axis**
- (2) Tests estimating serum concentrations of **T4 & T3**
- (3) Tests reflecting the **impact** of thyroid hormone on **tissues**;
- (4) Tests presenting **autoimmune** thyroid disease;
- (5) Tests providing information about thyroidal **iodine** metabolism.



Automated
Immunoassay System



Electro-chemiluminescence
Immunoassay (ECLIA) System



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Clinical & Research
Microscopes



Thyroid Lab Tests

Thyroid-related Laboratory tests can be divided into five (5) major categories:

(1) Tests assessing Hypothalamus-Pituitary-Thyroid (**HPT**) axis

- TRH Stimulation Test
- TSH

(2) Tests estimating serum concentrations of **T4 & T3**

(3) Tests reflecting the **impact** of thyroid hormone on **tissues**;

(4) Tests presenting **autoimmune** thyroid disease;

(5) Tests providing information about thyroidal **iodine** metabolism.

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

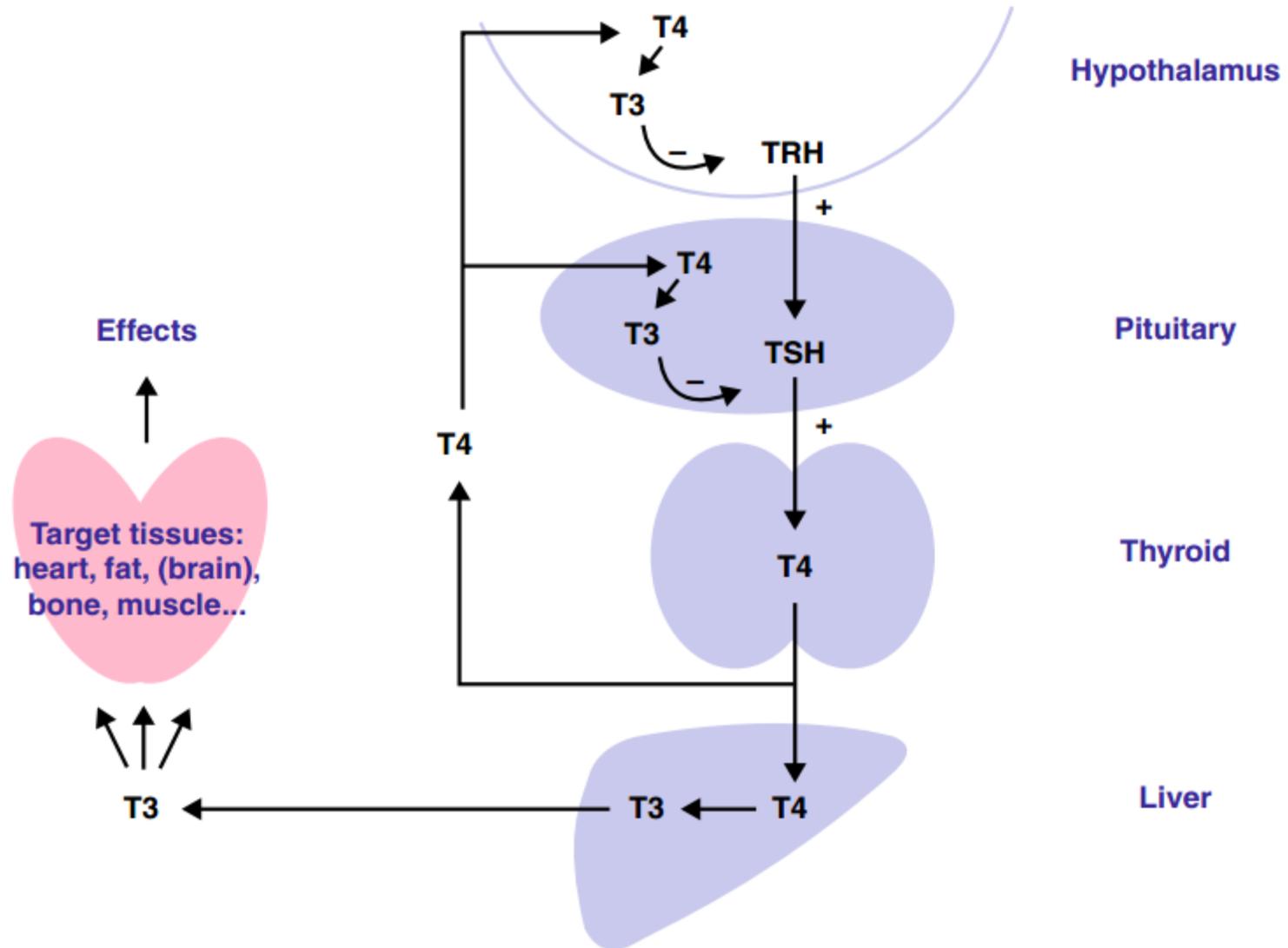
• CA 125 • CA 19-9 • CA 15-3

NEW KITS

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• کیت‌های تشخیص طی الیزا

Hypothalamus-Pituitary-Thyroid-Peripheral tissues Axis



TSH Assay



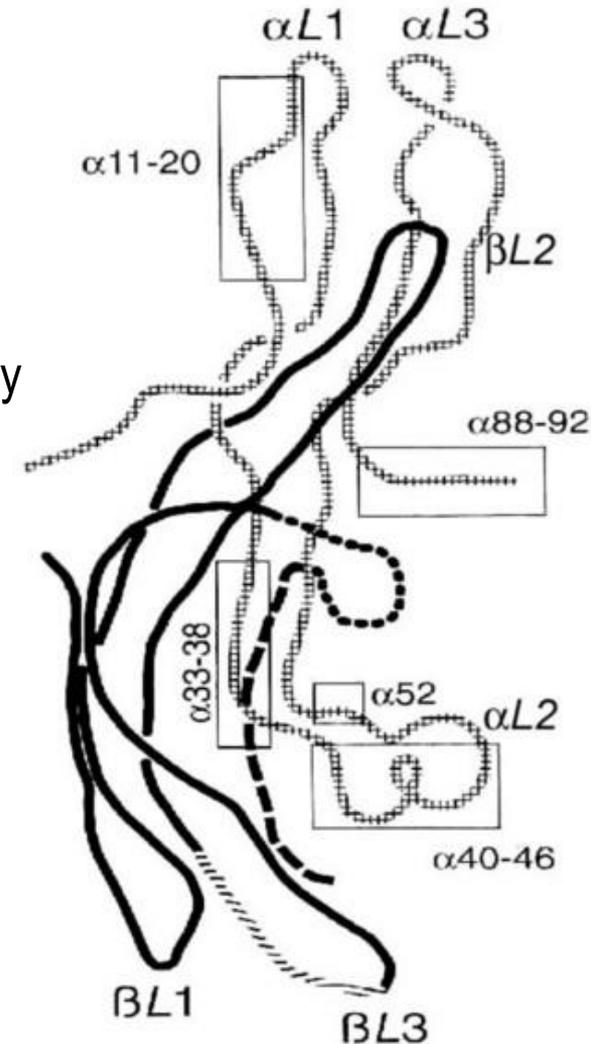
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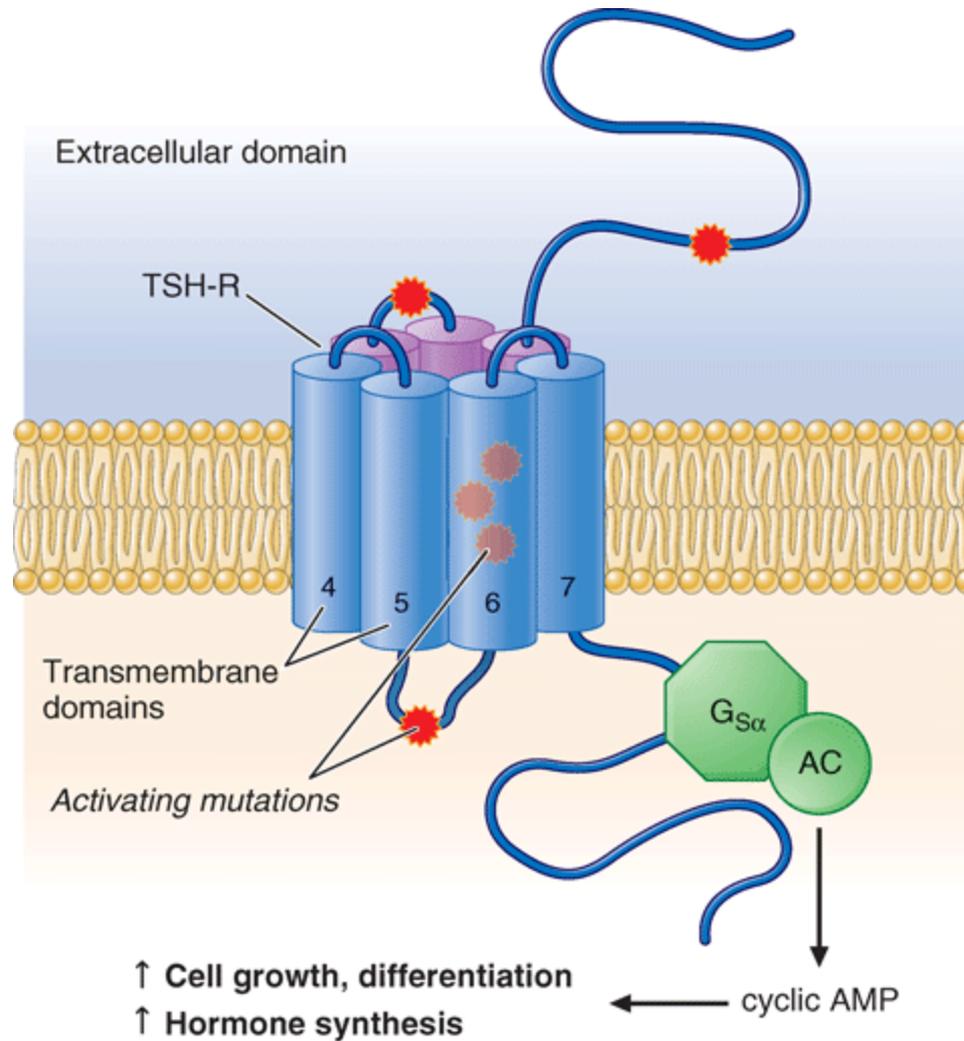
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Thyroid Stimulating Hormone (TSH)

- ✓ A heterodimeric glycosylated **peptide** ($\alpha=92$, $\beta=118$)
- ✓ $M_w = 28$ to 30 kDa
- ✓ Synthesized & secreted from thyrotrophs of the anterior pituitary
- ✓ Turnover: 40 - 150 mU/day
- ✓ Half Life: 1 hour
- ✓ Major role: Regulates the growth and function of thyroid gland



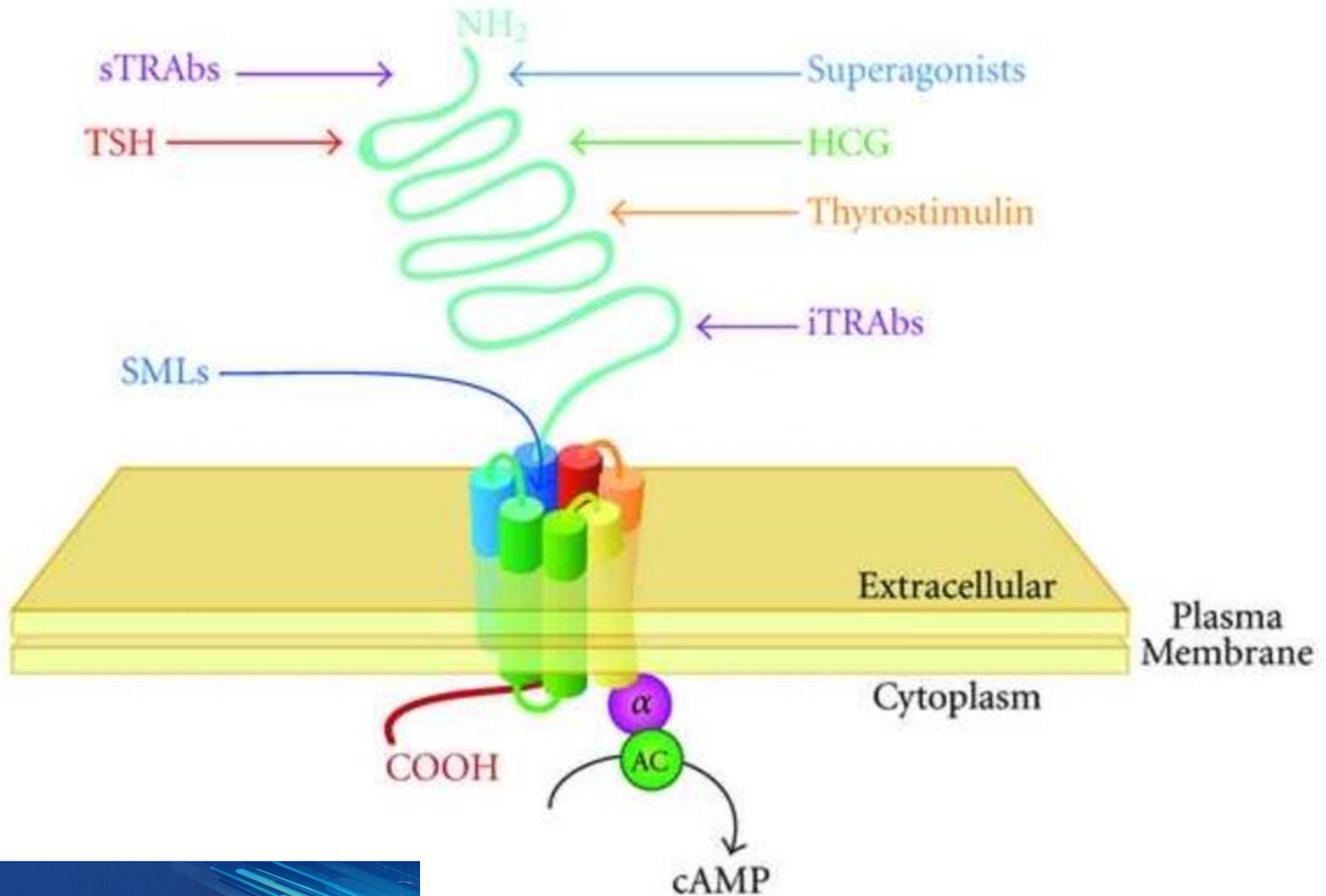
TSH Receptor



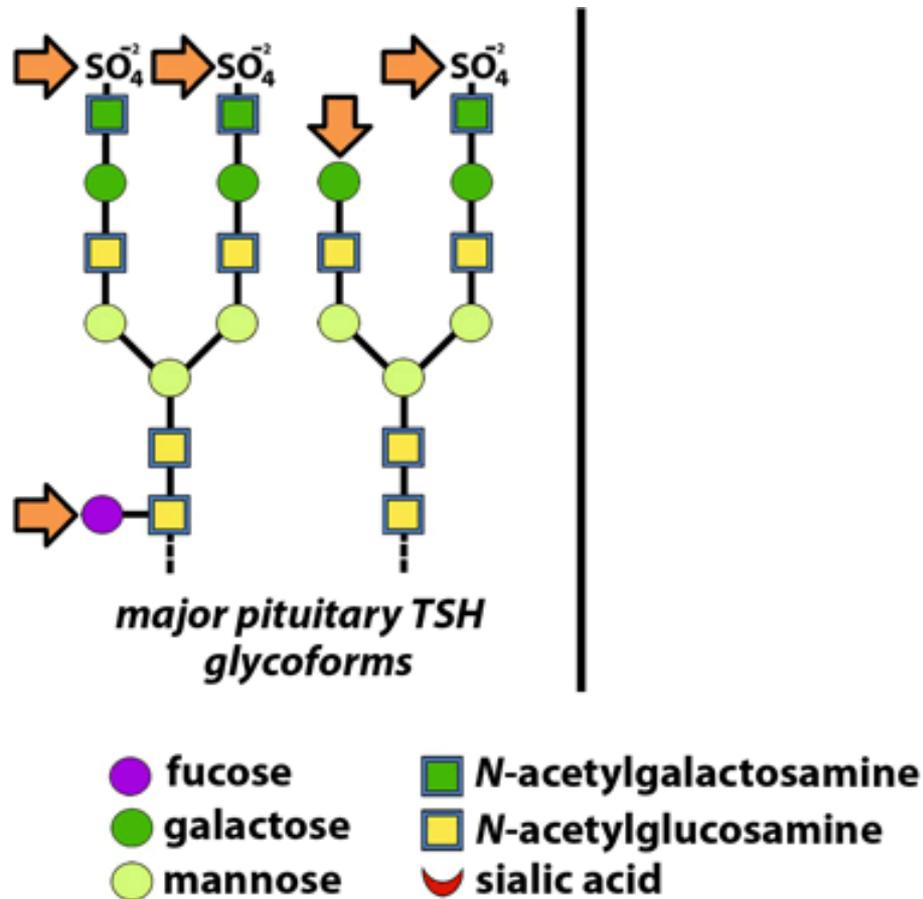
Source: Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine, 18th Edition*: www.accessmedicine.com

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TSH Receptor



Thyroid Stimulating Hormone (Glycobiology)



<https://www.aacc.org/publications/cln/articles/2013/may/tsh-harmonization>. Last seen: 4/23/2016

TSH assay Functional Sensitivity

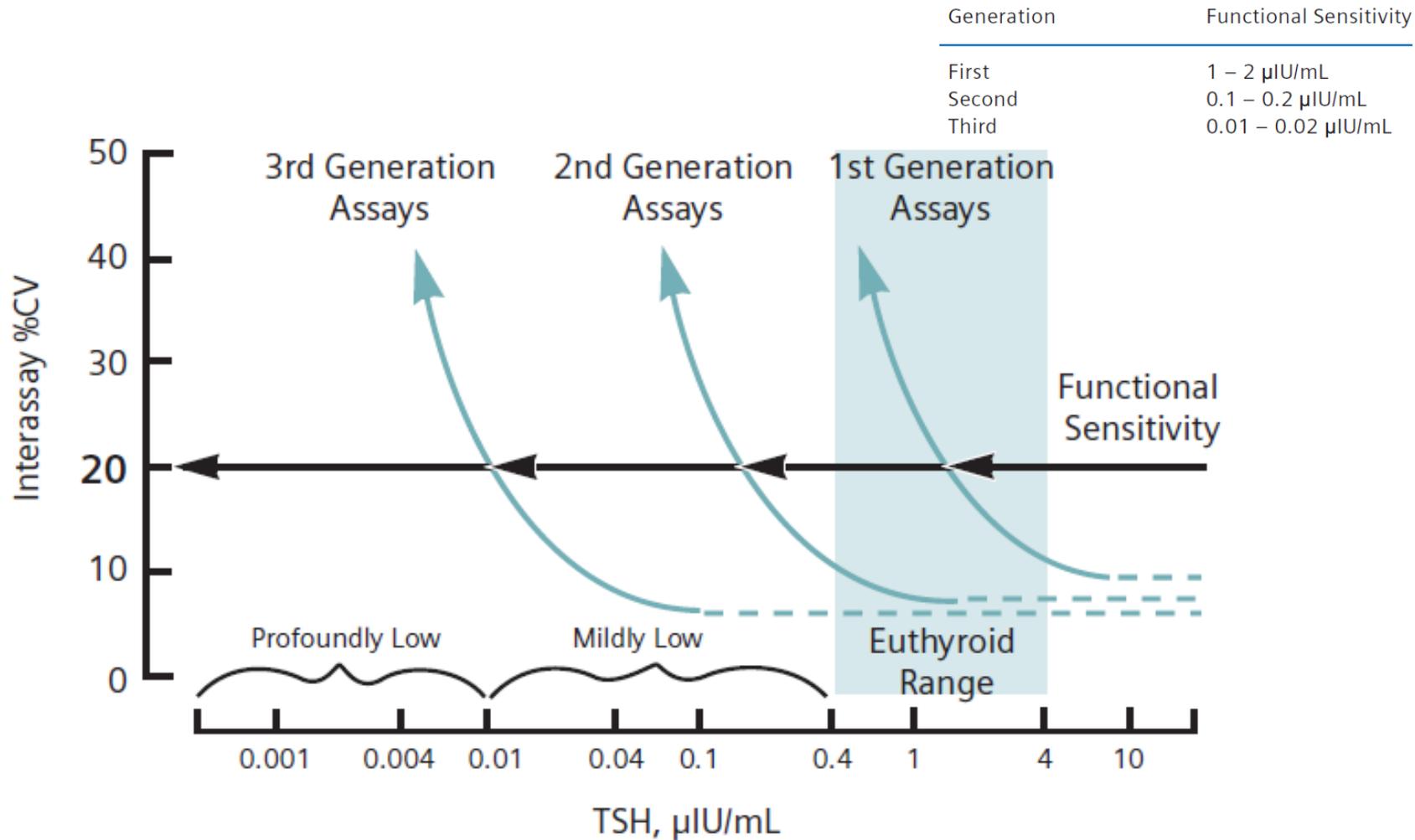
(Assay Generations)

Generation	Functional Sensitivity*
First	1 – 2 $\mu\text{IU/mL}$
Second	0.1 – 0.2 $\mu\text{IU/mL}$
Third	0.01 – 0.02 $\mu\text{IU/mL}$
Fourth	0.001 – 0.002 $\mu\text{IU/mL}$

*<20% interassay precision within these ranges.

Functional sensitivity is defined as the lowest concentration of TSH at which an interassay coefficient of variation of 20% can be achieved.

TSH Functional Sensitivity (Assay Generations)



ATA: only TSH assays with 3rd generation functional sensitivity can be used as first line thyroid tests.

TSH Assays

(Methodologies)

- Bioassays

- Stimulation of colloid droplet formation in the guinea pig thyroid gland
- Release of labeled thyroidal iodide into mouse blood

- Immunoassays

- Hemagglutination Inhibition Test
- Radio Immuno Assay (RIA): 1st
- Immuno Metric Assays

Generation	Functional Sensitivity
First	1 – 2 μ IU/mL
Second	0.1 – 0.2 μ IU/mL
Third	0.01 – 0.02 μ IU/mL

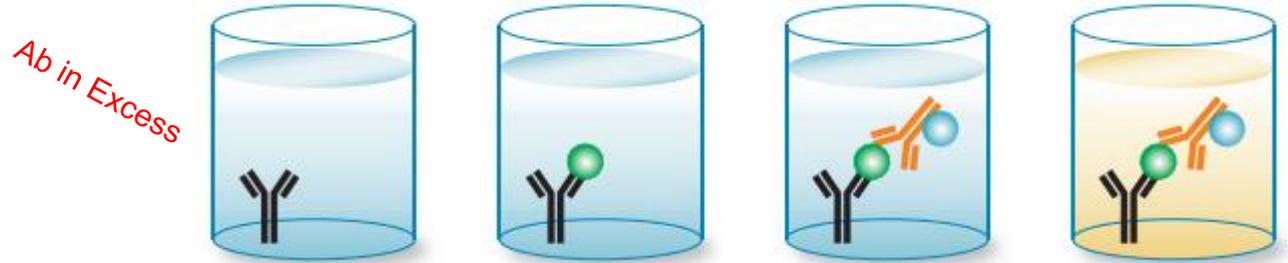
1. Isotopic IMAs

- Immuno RadioMetric Assay (IRMA): 2nd

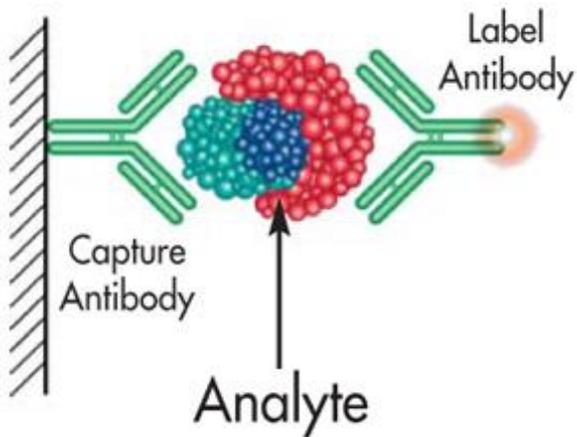
2. Non-Isotopic IMAs

- Immuno EnzymoMetric Assays: 0.1-0.2 => 2nd
- Immuno FlouroMetric Assays
 - VIDAS System (ELFA): 0.05
- Immuno ChemiluminoMetric Assays: 0.01-0.02 => 3rd
 - Electro Chemi Luminescence IA (ECLIA): 0.014

TSH Sandwich ELISA



<https://www.bio-rad-antibodies.com>



<http://scantibodies.com/hbr.html>

- Non-Isotopic IMAs
 - Improved sensitivity
 - Rapid turnaround time
 - wider linear measurement range
 - Rare Hook Effects
 - Safer*

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

• CA 125 • CA 19-9 • CA 15-3

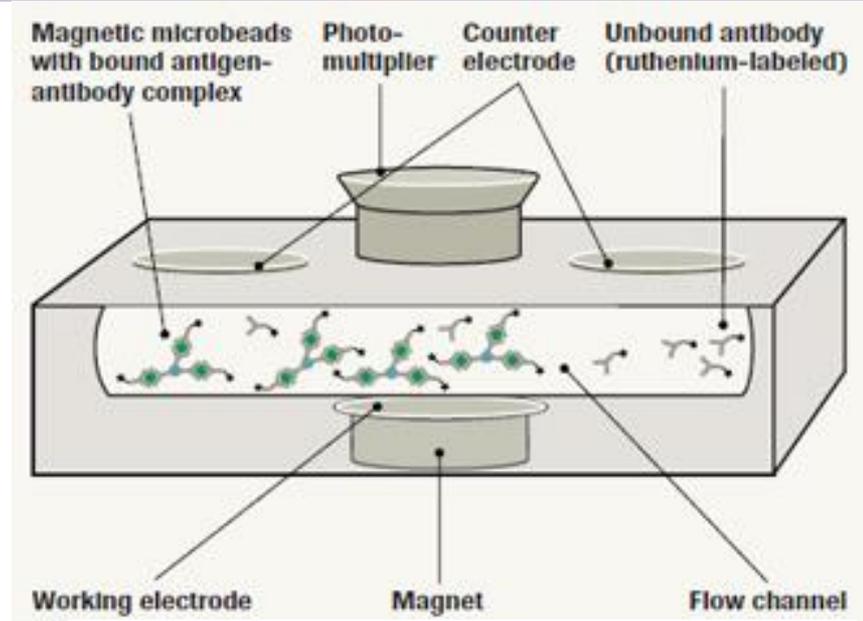
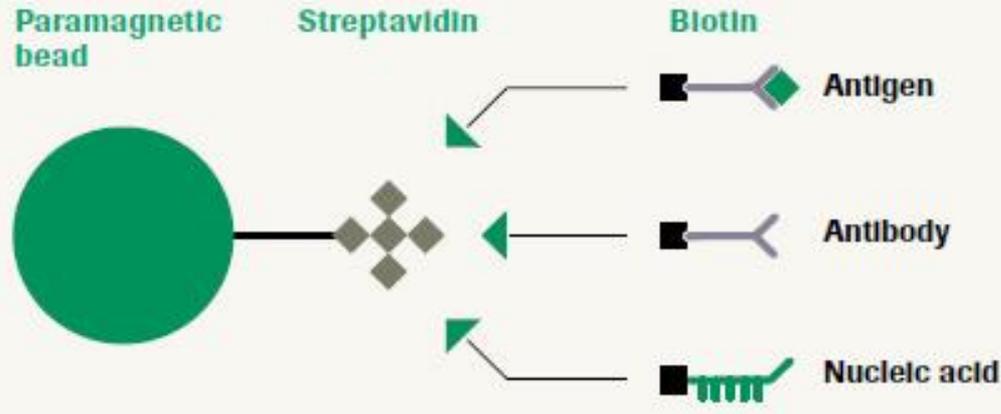
NEW KITS

تولید کننده

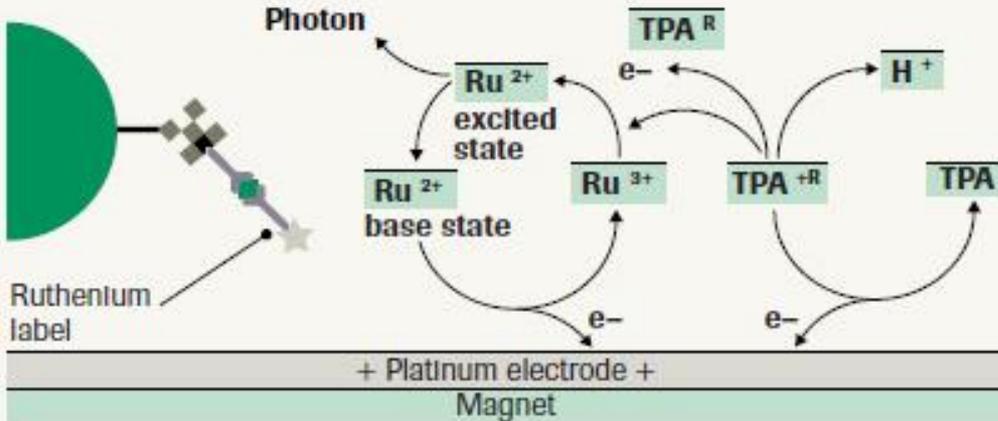
• کیت‌های تشخیص طی الایزا

ECL Technology

The basic principle



Reaction phase-light generation



Test Catalog

Search [Go](#)

Test Name

A	B	C	D	E	F
G	H	I	J	K	L
M	N	O	P	Q	R
S	T	U	V	W	X
Y	Z	#			

Test Catalog

Test Updates

New Tests

Tests by Classification Type

Test Setup Information

Performing Locations

Ordering and Results

Utilization Management

Specialties and Research

Specimen Handling

Education

Outreach Resources

Customer Service

Share: [f](#) [t](#) [e](#) [m](#)

Test ID: STSH

Thyroid-Stimulating Hormone-Sensitive (s-TSH), Serum

[Overview](#)

[Specimen](#)

[Clinical and Interpretive](#)

[Performance](#)

[Fees and Coding](#)

[Test Setup](#)

Useful For

Screening for thyroid dysfunction and detecting mild (subclinical), as well as overt, primary hypo- or hyperthyroidism in ambulatory patients

Monitoring patients on thyroid replacement therapy

Confirmation of thyroid-stimulating hormone (TSH) suppression in thyroid cancer patients on thyroxine suppression therapy

Prediction of thyrotropin-releasing hormone-stimulated TSH response

Testing Algorithm

See Thyroid Function Ordering Algorithm in Special Instructions.

Special Instructions

- Thyroid Function Ordering Algorithm

Method Name

Electrochemiluminescent Immunoassay

TSH assay facts

- **Patient Preparation:** For **12 hours before this blood test do not** take multivitamins or dietary supplements containing biotin (vitamin B7), which is commonly found in hair, skin, and nail supplements and multivitamins.
- Sample: Serum/plasma (50-200 µL)
- Preferred Storage:
 - Refrigerated (7 days)*
 - Frozen (30 days)
 - Ambient (7 days)
- **Reject Due To**
 - Hemolysis: Mild OK; Gross reject
 - Lipemia: Mild OK; Gross OK
 - Icterus: Mild OK; Gross OK
- Preferred Procedure in USA: Electro ChemiLuminescent Immunoassay
 - ARUP Laboratories
 - Mayoclinic Lab

TSH RCPA TEa:	
upto 0.5 mU/L	± 0.1
> 0.50 mU/L	20%

<http://www.rcpaqa.com.au/docs/2014/chempath/ALP.pdf>

TRH Stimulation Test



Automated
Immunoassay System



Electro-chemiluminescence
Immunoassay (ECLIA) System



Clinical & Research
Microscopes



شرکت بنیان درمان
تلفن: ۰۵۰۰۳۸۷۰۳۰۰ (خط ۱۰)

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

NEW KITS

• CA 125 • CA 19-9 • CA 15-3

تولید کننده
کیت‌های تشخیص طبی الیزا



TRH Stimulation Test

1. A baseline TSH test is done.
 2. Then an injection of TRH, which stimulates the pituitary to release TSH.
 3. A second blood sample is drawn 20 to 30 minutes later, and the TSH level is retested.
- TRH is known generically as protirelin (Thyrel),
 - *The TSH test is a picture in time of circulating levels of thyroid hormone. But by challenging the thyroid, the TRH Stimulation Test evaluates the thyroid's actual ability to function in real life.*
 - The TRH test is occasionally used to help identify secondary hypothyroidism (hypothyroidism due to pituitary problems) and tertiary hypothyroidism (hypothyroidism due to hypothalamic disorder).
 - *The test is important when traditional TSH tests results are borderline, and when a patient has obvious thyroid symptoms but normal TSH results.*
 - *In some individuals (and depending on the physician's interpretation of the laboratory tests), outright hypothyroidism may take as long as 20 years to develop. With the help of measures such as the TRH stimulation test, one is able to diagnose hypothyroidism when the onset of symptoms (fatigue, weight gain, etc.) precedes abnormal laboratory values. Early intervention thus may save patients from years of needless suffering.*

TRH Stimulation Test

- **Previous Indications:**
 1. to discriminate between hypothalamic and pituitary causes of TSH deficiency
 2. differential the diagnosis of hyperthyroidism
 3. for the demonstration of residual abnormal somatotropin-secreting cells in acromegalic patients who release GH in response to TRH before treatment
- **Procedure:**
 1. Baseline TSH
 2. an injection of TRH, which stimulates the pituitary to release TSH
 3. Retesting TSH 20 to 30 minutes later
- **Current Indications:**
 - uncommon since the development of ultrasensitive assays for TSH



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 (DFO)



Trinocular Head With USB Digital Camera

شرکت بنیان درمان
تلفن: ۰۲۰-۸۸۷۰۳۰۵ (خط ۱)

- ANA
- ds DNA
- CCP
- AMH
- CA 19-9
- Folate
- CA 125
- PTH
- CA 15-3



تولید کننده

• کیت‌های تشخیص طی الایزا

NEW KITS



ژال تجهیز

دیپارتمان آموزش و پژوهش

انجمن علمی دکترای علوم آزمایشگاهی

Education and Research
Department of DCLS
Association of Iran

تشخیص طبی ایران



انجمن علمی دکترای علوم آزمایشگاهی
تشخیص طبی ایران



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Thyroid Lab Tests

Thyroid-related Laboratory tests can be divided into five (5) major categories:

(1) Tests assessing Hypothalamus-Pituitary-Thyroid (HPT) axis

(2) Tests estimating serum concentrations of T4 & T3

(3) Tests reflecting the **impact** of thyroid hormone on **tissues**;

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(5) Tests providing information about thyroidal **iodine** metabolism.



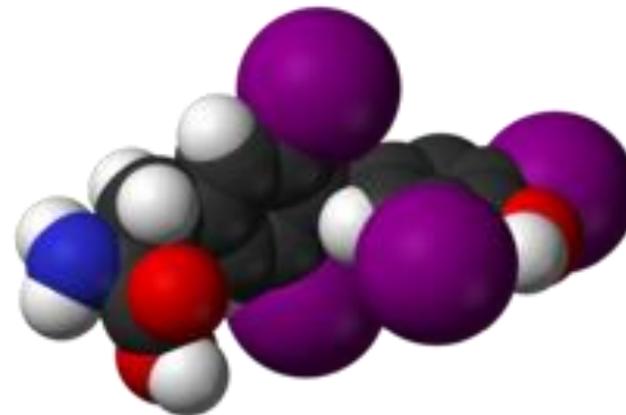
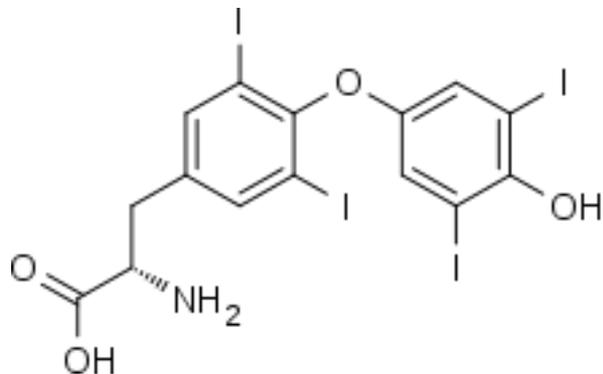
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T4 & T3 assays

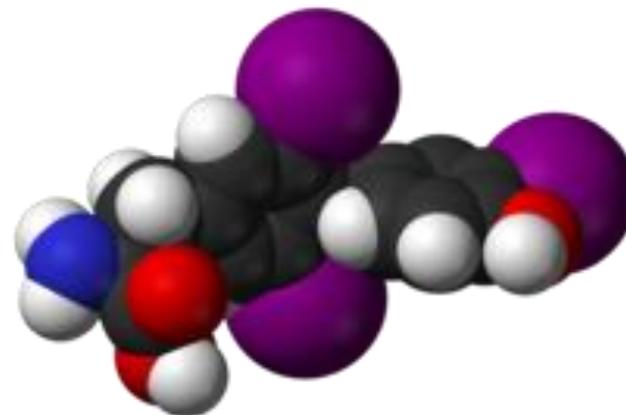
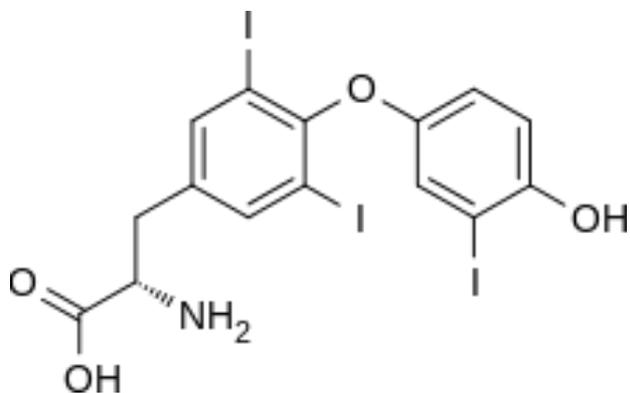


T3 (Triiodothyronine) & T4 (Thyroxine)

Molecular Structures



The structural formula (left) and a space-filling model (right) of (S)-thyroxine (T4). **MW=776.87**



The structural formula (left) and a space-filling model (right) of (S)-triiodothyronine (T₃, also called [liothyronine](#) in the pharmaceutical industry). **MW=650.978**

Comparison of T3 and T4 in Humans

Parameter	T ₃	T ₄
Production rate (nmol/day)	50	110
Fraction from thyroid	0.2	1.0
Relative metabolic potency	1.0	0.3
Serum concentration		
Total (nmol/L)	1.8	100
Free (pmol/L)	5	20
Fraction of total hormone in free form ($\times 10^{-2}$)	0.3	0.02
Distribution volume (L)	40	10
Fraction intracellular	0.64	0.15
Half-life (days)	0.75	6.7

To convert T4 from nmol/L to $\mu\text{g/dL}$ (total) or pmol/L to ng/dL (free), divide by 12.87. To convert T3 from nmol/L to ng/dL (total) or pmol/L to pg/dL (free), multiply by 65.1.

T4 & T3 assay facts

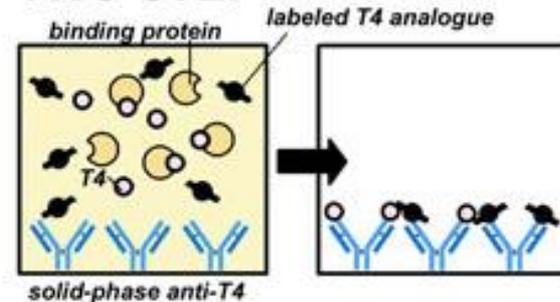
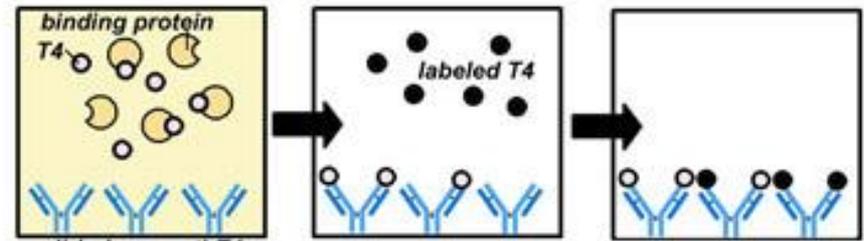
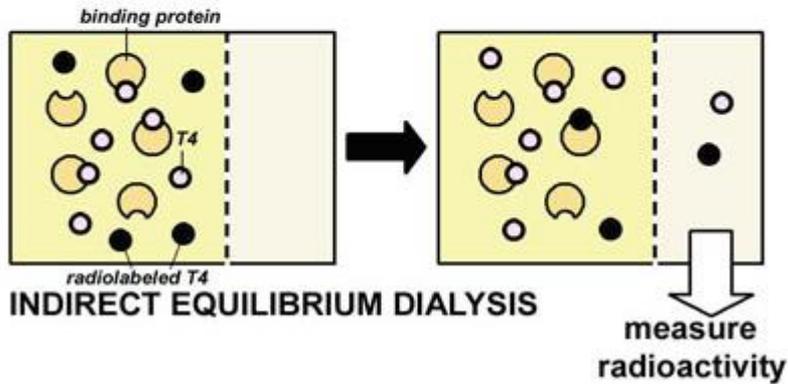
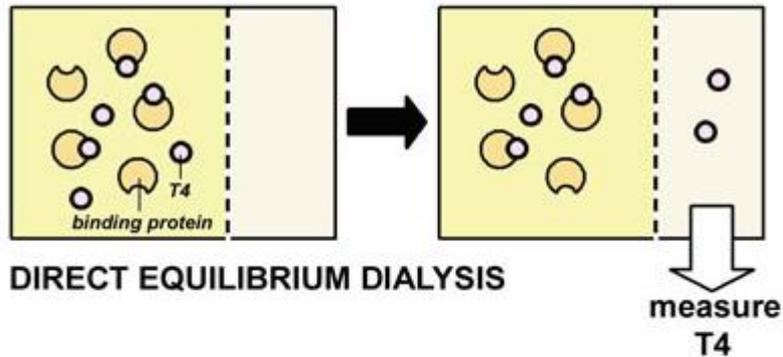
- **Patient Preparation:** For **12 hours before this blood test do not** take multivitamins or dietary supplements containing biotin (vitamin B7), which is commonly found in hair, skin, and nail supplements and multivitamins.
- Sample: Serum/plasma (50-200 μ L)
- Preferred Storage:
 - Refrigerated (7 days)*
 - Frozen (30 days)
- Preferred Procedure in USA: Electro ChemiLuminescent Immunoassay
 - ARUP Laboratories
 - Mayo Clinic Lab
- Reject Due To
 - Hemolysis: Mild OK; Gross Reject
 - Lipemia: Mild OK; Gross OK
 - Icterus: Mild OK; Gross OK
- **Standardization available**

T4 RCPA TEa:	
up to 120 nmol/L	± 12
> 120 nmol/L	10%

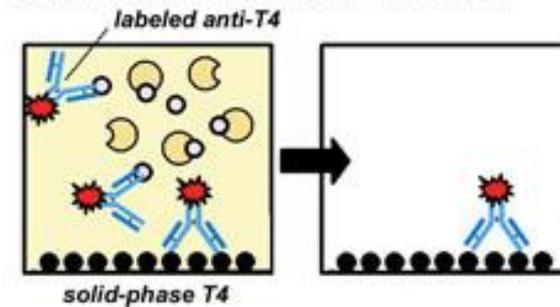
T3 RCPA TEa:	
up to 1.3 nmol/L	± 0.2
> 1.3 nmol/L	15%

<http://www.rcpaqap.com.au/docs/2014/chempath/ALP.pdf>

Free T4 Assays



ONE-STEP ANALOGUE



Medications displacing T4 from TBG

Table 5.2 Principal medications that displace T4 from TBG binding in normal human serum

Medication	Mean percent increase in free T4 fraction*
Salicylates	
• Acetyl salicylic acid (aspirin)	62
• Salicyl salicylic acid (salsalate)	>100
Furosemide [#]	5–30
Fenclofenac	90
Mefenamic acid	31
Flufenamic acid	10
Diclofenac	7
Diflunisal	37
Phenytoin	45
Carbamazepine	30

FT4 & FT3 assay facts

- **Patient Preparation:** For **12 hours before this blood test do not** take multivitamins or dietary supplements containing biotin (vitamin B7), which is commonly found in hair, skin, and nail supplements and multivitamins.
- Sample: Serum/plasma (50-200 µL)
- Preferred Storage:
 - Refrigerated (14 days)*
 - Frozen (30 days)
 - Ambient (72 hours)
- Preferred Procedure in USA: Electro ChemiLuminescent Immunoassay
 - ARUP Laboratories
 - MayoClinic Lab
- Reject Due To
 - Hemolysis: Gross OK
 - Lipemia: Mild OK; Gross OK
 - Icterus: Mild OK; Gross OK

FT4 RCPA TEa:
up to 12 pmol/L ± 1.5
> 12 pmol/L 12%

FT3 RCPA TEa:
up to 3.5 pmol/L ± 0.7
> 3.5 pmol/L 20%

<http://www.rcpaqap.com.au/docs/2014/chempath/ALP.pdf>

- Standardization available



Automated
Immunoassay System

شرکت بنیان درمان
تلفن: ۰۲۰۵۰۰۸۸۷ (خط ۱۰)



Electro-chemiluminescence
Immunoassay (ECLIA) System

Magnis

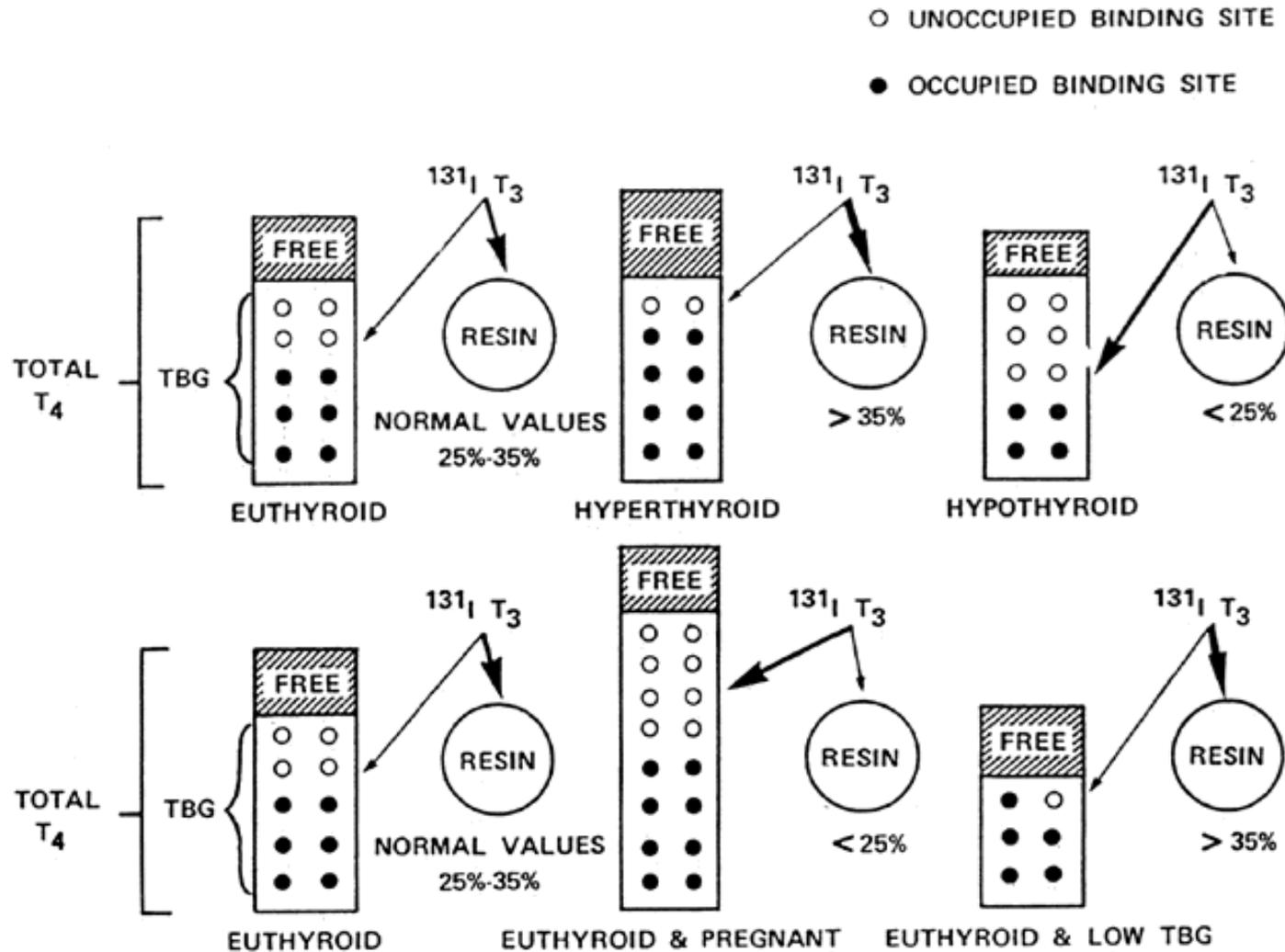


Clinical & Research
Microscopes

Free Thyroxin Index (FTI)



ResinT3 Uptake assay



Transformation of T-Uptake Units to %Uptake

- The transformed %Uptake values may differ from measured %T3 Uptake values on a given specimen for a number of reasons:
- The two assays measure different parameters of thyroxine binding proteins:
 - T-Uptake – Total binding capacity of TBG.
 - %T3 Uptake – Unsaturated binding capacity of binding proteins.
- T-Uptake levels for Hypothyroid and Hyperthyroid subjects are generally within the normal range.
- %T3 Uptake is sensitive to both binding protein concentration and T4 levels.

$$\text{Transformed \%Uptake} = \frac{\text{MEAN NORMAL RANGE}}{\sqrt{0.8(\text{T-Uptake Units})^2 + 0.2}}$$

$$\text{MEAN NORMAL RANGE} = \frac{\text{LOW NORMAL} + \text{HIGH NORMAL}}{2}$$

$$\text{T-Uptake Units} = \sqrt{\frac{(\text{MEAN NORMAL RANGE} / \%Uptake)^2 - 0.2}{0.8}}$$

Free Thyroxin Index (FTI)

- The FTI value can be calculated with any of the following formulas:

- $\frac{\text{Total T}_4}{\text{T-Uptake Unit}}$
- $\text{Total T}_4 \times \% \text{Uptake}$
- $\text{Total T}_4 \times \frac{\% \text{Uptake}}{100\%}$

Thyroid Function Test	Measurement	Normal Range
Total T4 (TT4)	bound and free T4	4.5 -11.5 ug/dL
Free T4 (FT4)	free T4	0.8 -2.8 ng/dL
Free T4 Index (FT4I)	estimate of free T4 FT4I = TT4 x RT3U	1.0 -4.3 U
Total T3 (TT3)	bound and free T3	75 -200 ng/dL
Resin T3 Uptake (RT3U)	binding capacity of TBG	25 -35%
TRH	TRH	5 -25 mIU/mL
TSH	TSH	0.3 - 5.0 U/mL
Thyroglobulin	Thyroglobulin	5-25 ng/mL
Radioactive Iodine Uptake (RAIU)	Distribution of radiolabeled iodine in the thyroid	5 hr – 5 to 15% 24 hr – 15 to 35%

$$\text{FTI} = \text{TT4} \times \% \text{Uptake} / 100$$

FTI Unit: ?

- Same as T4.
RI= 1.3 – 4 µg/dL

- TBI:
 $\text{FTI} = \text{T4} \times \text{THBR} (\text{T3 Uptake/Normal T3 Uptake})$
RI= 0.85 - 1.1

Thyroid Lab Tests

Thyroid-related Laboratory tests can be divided into five (5) major categories:

(1) Tests assessing Hypothalamus-Pituitary-Thyroid (HPT) axis

(2) Tests estimating serum concentrations of T4 & T3

(3) Tests reflecting the impact of thyroid hormone on tissues;

- CBC
- Lipid Panel
- Basic Metabolic Panel (Glucose, Creatinine, Electrolytes, CO₂, Cl)
- SGOT, SGPT, CPK
- Prolactin
-

(4) Tests presenting **autoimmune** thyroid disease;

(5) Tests providing information about thyroidal **iodine** metabolism.



Tests reflecting the impact of thyroid hormone on tissues

- The complete blood count and metabolic profile may show abnormalities in patients with hypothyroidism.
 - anemia,
 - dilutional hyponatremia,
 - hyperlipidemia,
 - increases in serum creatinine (reversible)
- Elevations in transaminases and creatinine kinase (CK) have also been found in hypothyroidism
- Primary hypothyroidism causes an elevation of TRH,
 - which can cause an elevation of prolactin along with TSH.
 - Prolactin levels in patients with hypothyroidism tend to be lower than those usually seen with prolactinomas (the latter are usually 150-200 ng/mL or higher).

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(2) Tests estimating serum concentrations of T4 & T3

(3) Tests reflecting the **impact** of thyroid hormone on **tissues**;

(4) Tests presenting autoimmune thyroid disease;

- Auto Abs (Anti Thyroid Abs)
 - Anti-TPO Abs
 - Anti-Tg-Abs
 - Anti-TSH Receptor (TSHR) Abs*
 - Stimulatory
 - Inhibitory
- Tissue Inflammation

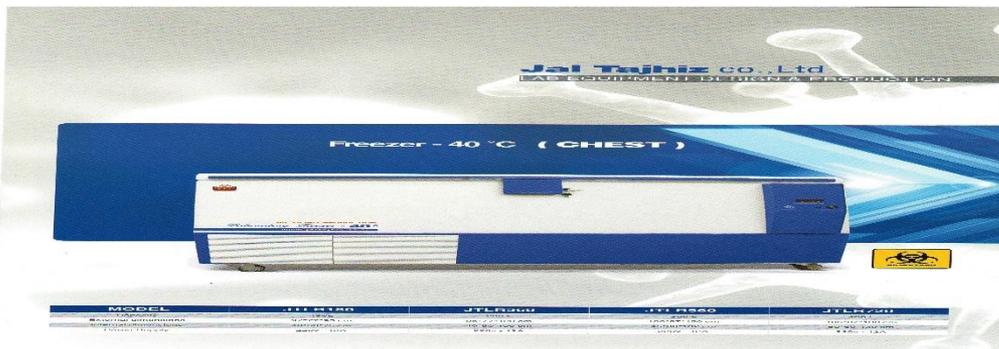
(5) Tests providing information about thyroidal **iodine** metabolism.

Anti Thyroid Auto Antibodies

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.

Thyroperoxidase (TPO) Antibodies (Anti-TPO)



Anti-TPO assay

- Thyroperoxidase (TPO): an enzyme catalyzing the oxidation of iodide on tyrosine residues in thyroglobulin for the synthesis of T3 and T4
- TPO is a membrane-associated **hemoglycoprotein** expressed only in thyrocytes and is one of the most important thyroid gland antigens.
- Anti-TPO antibodies activate complement and are thought to be significantly involved in thyroid dysfunction and the pathogenesis of hypothyroidism.
- TPO antibody assay: the most sensitive test for detecting autoimmune thyroid disease (eg, Hashimoto thyroiditis, idiopathic myxedema, and Grave's disease)
- The highest TPO antibody levels are observed in patients suffering from Hashimoto thyroiditis (prevalence= about 90% of cases).
- Anti-TPO antibodies also frequently occur (60%–80%) in the course of Grave's disease.
- In patients with subclinical hypothyroidism, the presence of TPO antibodies is associated with an increased risk of developing overt hypothyroidism. Many clinical endocrinologists use the TPO antibody test as a diagnostic tool in deciding whether to treat a patient with SC hypothyroidism.

Anti-TPO assay facts

- **Patient Preparation:** For **12 hours before this blood test do not** take multivitamins or dietary supplements containing biotin (vitamin B7), which is commonly found in hair, skin, and nail supplements and multivitamins.
- Sample: Serum/plasma (50-200 μ L)
- Preferred Storage:
 - Refrigerated (7 days)*
 - Frozen (30 days)
- Preferred Procedure in USA: Chemiluminometric Immunoassay
 - ARUP Laboratories
 - Mayo Clinic Lab
- Reject Due To
 - Hemolysis: Mild OK; Gross reject
 - Lipemia: Mild OK; Gross OK
 - Icterus: NA
- RI= < 9.0 IU/mL
- Moderately increased levels of TPO antibodies may be found in patients with non-thyroid autoimmune disease such as pernicious anemia, type I diabetes, or other disorders that activate the immune system.

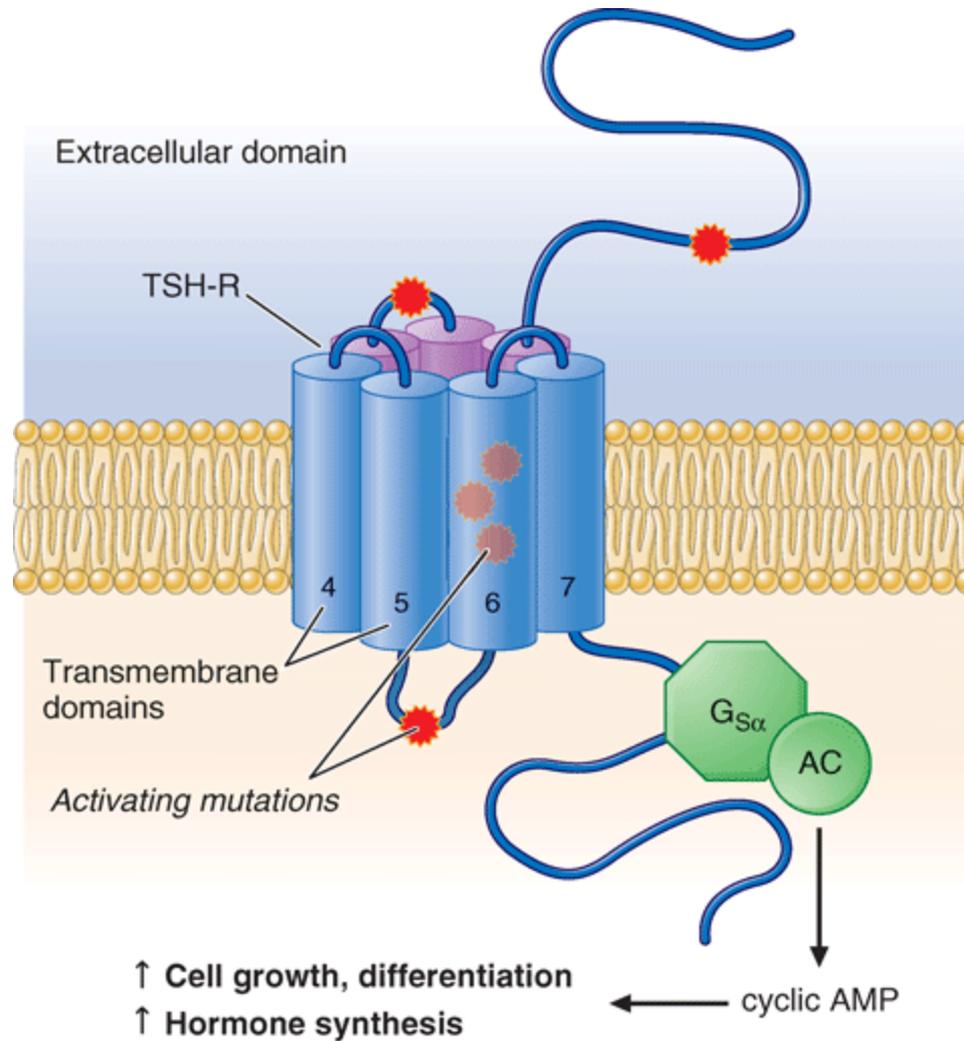
Anti-Tg assay

- Thyroglobulin autoantibodies bind thyroglobulin (Tg), a major thyroid-specific protein. Tg plays a crucial role in thyroid hormone synthesis, storage, and release.
- Tg leakage into the systemic circulation: follicular destruction through inflammation (thyroiditis and autoimmune hypothyroidism), hemorrhage (nodular goiter), or rapid disordered growth of thyroid tissue, as may be observed in Graves disease or follicular cell-derived thyroid neoplasms
- This results in the formation of anti-Tg in some individuals. The same processes also may result in exposure of other "hidden" thyroid antigens to the immune system, resulting in the formation of autoantibodies to other thyroid antigens, in particular thyroid peroxidase (TPO) (anti-TPO).
- In individuals with autoimmune hypothyroidism, 30% to 50% will have detectable anti-Tg autoantibodies, while 50% to 90% will have detectable anti-TPO autoantibodies. In Graves disease, both types of autoantibodies are observed at approximately half these rates.
- The presence of anti-Tg, which occurs in 15% to 30% of thyroid cancer patients, could result in misleading Tg results.
- Measurements of anti-TPO have higher sensitivity and equal specificity to anti-Tg measurements in the diagnosis of autoimmune thyroid disease. Anti-Tg levels should, therefore, only be measured if anti-TPO measurements are negative, but clinical suspicion of autoimmune thyroid disease is high.

Anti-Tg assay facts

- **Patient Preparation:** For **12 hours before this blood test do not** take multivitamins or dietary supplements containing biotin (vitamin B7), which is commonly found in hair, skin, and nail supplements and multivitamins.
- Sample: Serum/plasma (50-200 μ L)
- Preferred Storage:
 - Refrigerated (7 days)*
 - Frozen (30 days)
- Preferred Procedure in USA: Immunoenzymatic Assay
 - Mayoclinic Lab
- Reject Due To
 - Hemolysis: Mild OK; Gross reject
 - Lipemia: Mild OK; Gross OK
 - Icterus: NA
- RI= < 4.0 IU/mL
- In immunometric assays, the presence of thyroid antibody can lead to false-low measurement; whereas it might lead to false-high results in competitive assays.

TSHR



Source: Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine, 18th Edition*: www.accessmedicine.com

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Anti TSH-R Antibodies (TSHR-antibody)

- Autoantibodies that bind and transactivate the TSHR lead to stimulation of the thyroid gland independent of the normal feedback-regulated thyroid-stimulating hormone (TSH) stimulation.
- These TSHR autoantibodies also are known as long-acting-thyroid-stimulator (LATS) or **Thyroid-Stimulating Immunoglobulins (TSI)**.
- Some patients with Graves disease also have **TSHR-blocking** antibodies, which do not transactivate the TSHR.
- The balance between TSI and TSHR-blocking antibodies, as well as their individual titers, are felt to be determinants of Graves disease severity.
- At least 20% of patients with autoimmune hypothyroidism also have evidence either of TSHR-blocking antibodies or, less commonly, TSI.
- First-order tests for autoimmune thyroid disease include TPO Antibodies (most suited for suspected cases of autoimmune hypothyroidism) and TSHR-antibody, a binding assay that detects both TSI and TSHR-blocking autoantibodies; it can be used instead of TSI assay for most applications, as long as the results are interpreted in the clinical context.
- The TSHR-antibody test has a shorter turnaround time than the TSI assay, is less expensive, less analytical variability and if interpreted within the clinical context, has excellent correlation with the TSI assay.
- Specific detection of TSI is accomplished by this second-order bioassay.

TSHR-antibody assay facts

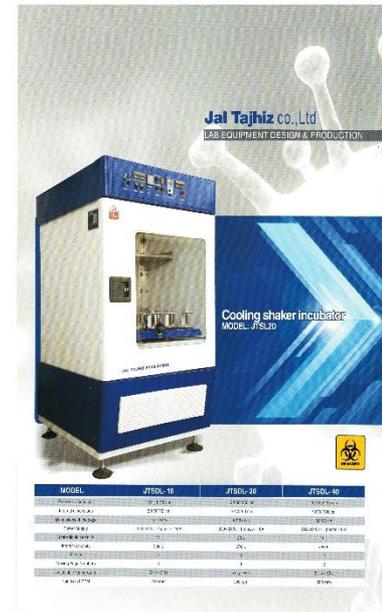
- **Patient Preparation:** For **12 hours before this blood test do not** take multivitamins or dietary supplements containing biotin (vitamin B7), which is commonly found in hair, skin, and nail supplements and multivitamins. Do not use specimens from patients receiving heparin treatment. In rare cases, interference due to extremely high titers of antibodies to streptavidin and ruthenium can occur.
- Sample: Serum/plasma (50-200 μ L)
- Preferred Storage:
 - Refrigerated (7 days)
 - Frozen (30 days) *
- Preferred Procedure in USA : Electrochemiluminescence Immunoassay
 - Mayo Clinic Lab
- Reject Due To
 - Hemolysis: Mild OK; Gross reject
 - Lipemia: Mild OK; Gross OK
 - Icterus: Mild OK; Gross OK
- RI= $<$ or = 1.75 IU/L
- A sensitivity of 97% and a specificity of 99% for detection of Grave's disease
- An elevated TRAb test at the conclusion of a course of anti-thyroid drug treatment is highly predictive of relapse of Grave's disease. However, the converse, a normal TRAb test, is not predictive of prolonged remission.

TSI assay

- Second-order testing for autoimmune thyroid disease, including:
 - 1.-Differential diagnosis of etiology of thyrotoxicosis in patients with ambiguous clinical signs or contraindicated (eg, pregnant or breast-feeding) or indeterminate thyroid radioisotope scans
 - 2.-Diagnosis of clinically suspected Graves disease (eg, extrathyroidal manifestations of Grave's disease: endocrine exophthalmos, pretibial myxedema, thyroid acropachy) but normal thyroid function tests
 - 3.-Determining the risk of neonatal thyrotoxicosis in a fetus of a pregnant female with active or past Graves disease
 - 4.-Differential diagnosis of gestational thyrotoxicosis versus first-trimester manifestation or recurrence of Grave's disease
 - 5.-Assessing the risk of Grave's disease relapse after antithyroid drug treatment
- A combination of TSI and Thyrotropin Receptor Antibody, is useful as an adjunct in the diagnosis of unusual cases of hypothyroidism (eg, Hashitoxicosis)
- TSIs are IgG antibodies and can, therefore, cross the placental barrier, causing neonatal thyrotoxicosis.

TSI assay facts

- **Patient Preparation:**
- Sample: Serum/plasma (50-200 μ L)
- Preferred Storage:
 - Frozen (60 days) *
 - Refrigerated (7 days)
 - Ambient (24 hours)
- Preferred Procedure in USA: Recombinant Bioassay
 - Mayo Clinic Lab
- Reject Due To
 - Hemolysis: Mild OK; Gross reject
 - Lipemia: Mild OK; Gross OK
 - Icterus: Mild OK; Gross OK
- RI= < or = 1.3 TSI index



Thyroid Lab Tests

Thyroid-related Laboratory tests can be divided into five (5) major categories:

- (1) Tests assessing Hypothalamus-Pituitary-Thyroid (HPT) axis
- (2) Tests estimating serum concentrations of T4 & T3
- (3) Tests reflecting the **impact** of thyroid hormone on **tissues**;
- (4) Tests presenting autoimmune thyroid disease;
- (5) **Tests providing information about thyroidal iodine metabolism.**



Lifotronic
GeneStar-96 Real-Time
PCR System

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

شرکت بنیان درمان
تلفن: ۰۲۱-۸۸۶۰۰۰۵ (خط ۱)

24-Urine Idoine



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Assure reliable and accurate results
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شرکت بنیان دروآن
 تلفن: ۰۲۱۸۸۷۱۲۰۰ | (شماره ۱)

	IDEAL TECHNOLOGIES			SAMAN LABOUR				
Products	Hematology Panel	Tumor Markers	Vision D	MR System (Immunoassay)				
					Sero-logic Panel	Thrombolytics		
							Infectious & Rheumatology	Gastroenterology
	VisionLife	Microbiology						
			Coagulation	Microbiology				

JAL TAJHIZ MEHRAN
 LAB EQUIPMENT DESIGN & PRODUCTION



24-Urine Idoine

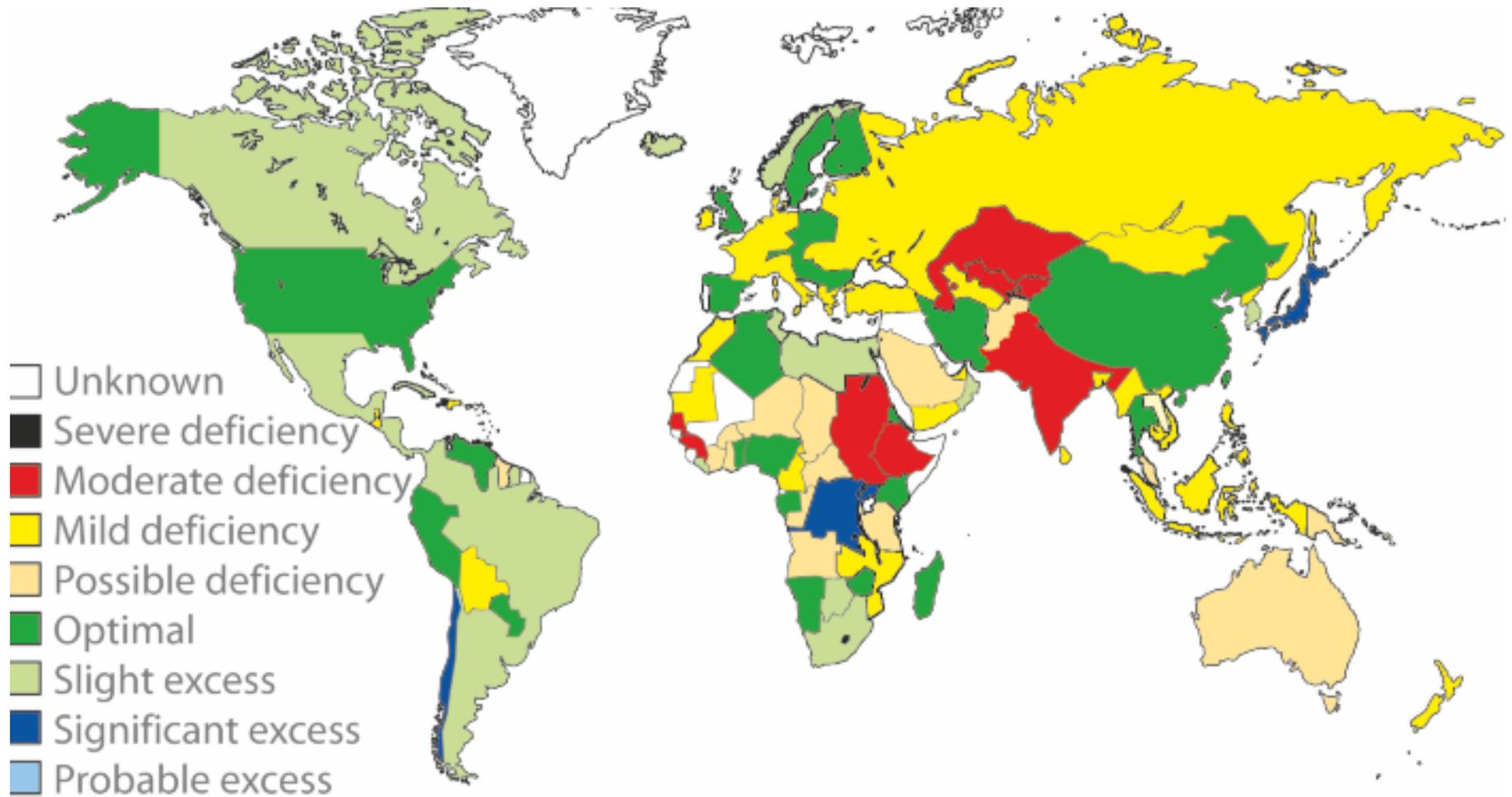
Table 1. Epidemiological criteria for assessing iodine nutrition based on median urinary iodine concentrations in school-age children

Median urinary iodine ($\mu\text{g/l}$)	Iodine intake	Iodine nutrition
< 20	Insufficient	Severe iodine deficiency
20–49	Insufficient	Moderate iodine deficiency
50–99	Insufficient	Mild iodine deficiency
100–199	Adequate	Optimal
200–299	More than adequate	Risk of iodine-induced hyperthyroidism in susceptible groups
>300	Excessive	Risk of adverse health consequences (IH, auto-immune thyroid diseases)

Adapted from: WHO/UNICEF/ICCIDD (2).

Global Iodine Availability

(Natural availability and I₂ consumed as food additives)



24-h Urine Idoine

- **Patient Preparation:**

- Sample: 24-h Urine (0.3 mL)

- Preferred Storage:

- Refrigerated (146 days) *
- Ambient (146 hours)
- Frozen (146 days)

- Preservative: 50% Acetic Acid

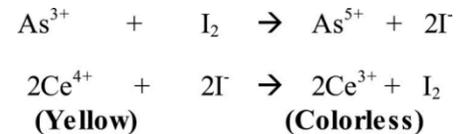
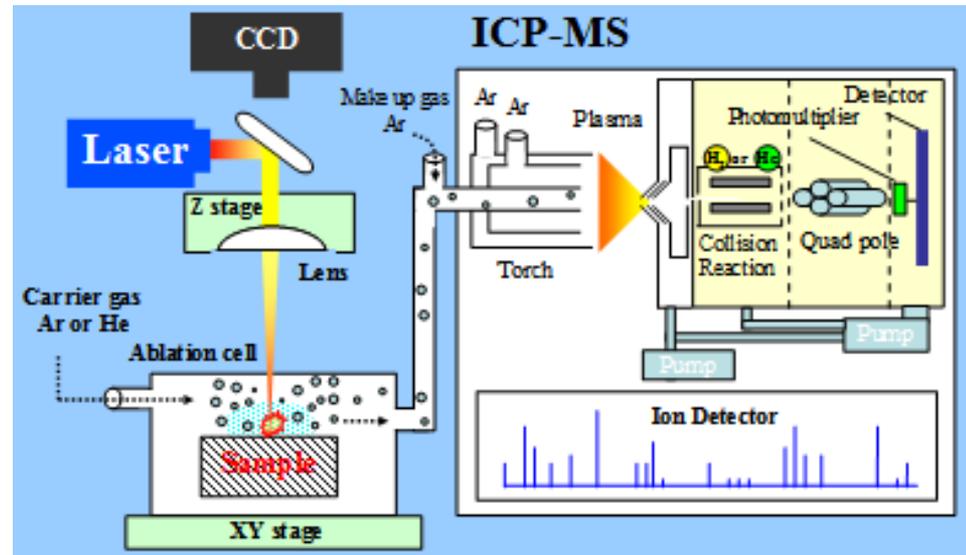
- Preferred Procedure (WHO)

- Ammonium Persulfate Method: (Sandell-Kolthoff reaction)

- Preferred Procedure in USA:

- Mayo Clinic Lab: Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)

- RI= 93-1,125 mcg/specimen



Assay Standardization ?



NEW Kits

- ANA
- ds DNA
- CA 125
- CCP
- AMH
- CA 19-9
- PTH
- Folate
- CA 15-3



- Tumor Markers
- Thyroid
- Gastroenterology
- Fertility
- Anemia
- Coagulation
- Rheumatology
- Steroids
- Allergy
- Vitamin D
- Thrombosis
- Vasculitis
- Infectious Diseases

Assay Standardization

Measurement units: the SI

- SI base units

1. Metre
2. Kilogram
3. Second
4. Ampere
5. Kelvin
6. Mole
7. Candela

- Derived Units

Derived quantity		SI coherent derived unit	
Name	Symbol	Name	Symbol
area	A	square metre	m^2
volume	V	cubic metre	m^3
speed, velocity	v	metre per second	m/s
acceleration	a	metre per second squared	m/s^2
wavenumber	$\sigma, \tilde{\nu}$	reciprocal metre	m^{-1}
density, mass density	ρ	kilogram per cubic metre	kg/m^3
surface density	ρ_A	kilogram per square metre	kg/m^2
specific volume	v	cubic metre per kilogram	m^3/kg
current density	j	ampere per square metre	A/m^2
magnetic field strength	H	ampere per metre	A/m
amount concentration ^(a) , concentration	c	mole per cubic metre	mol/m^3
mass concentration	ρ, γ	kilogram per cubic metre	kg/m^3
luminance	L_v	candela per square metre	cd/m^2
refractive index ^(b)	n	one	1
relative permeability ^(b)	μ_r	one	1

(a) In the field of clinical chemistry this quantity is also called substance concentration.

(b) These are dimensionless quantities, or quantities of dimension one, and the symbol "1" for the unit (the number "one") is generally omitted in specifying the values of dimensionless quantities.

Assay Standardization

Goal: Measurement results be comparable between laboratories and methods, over time, with common reference ranges.

Definition: Calibration traceable to International System of Units using a Reference Measurement Procedure (RMP)

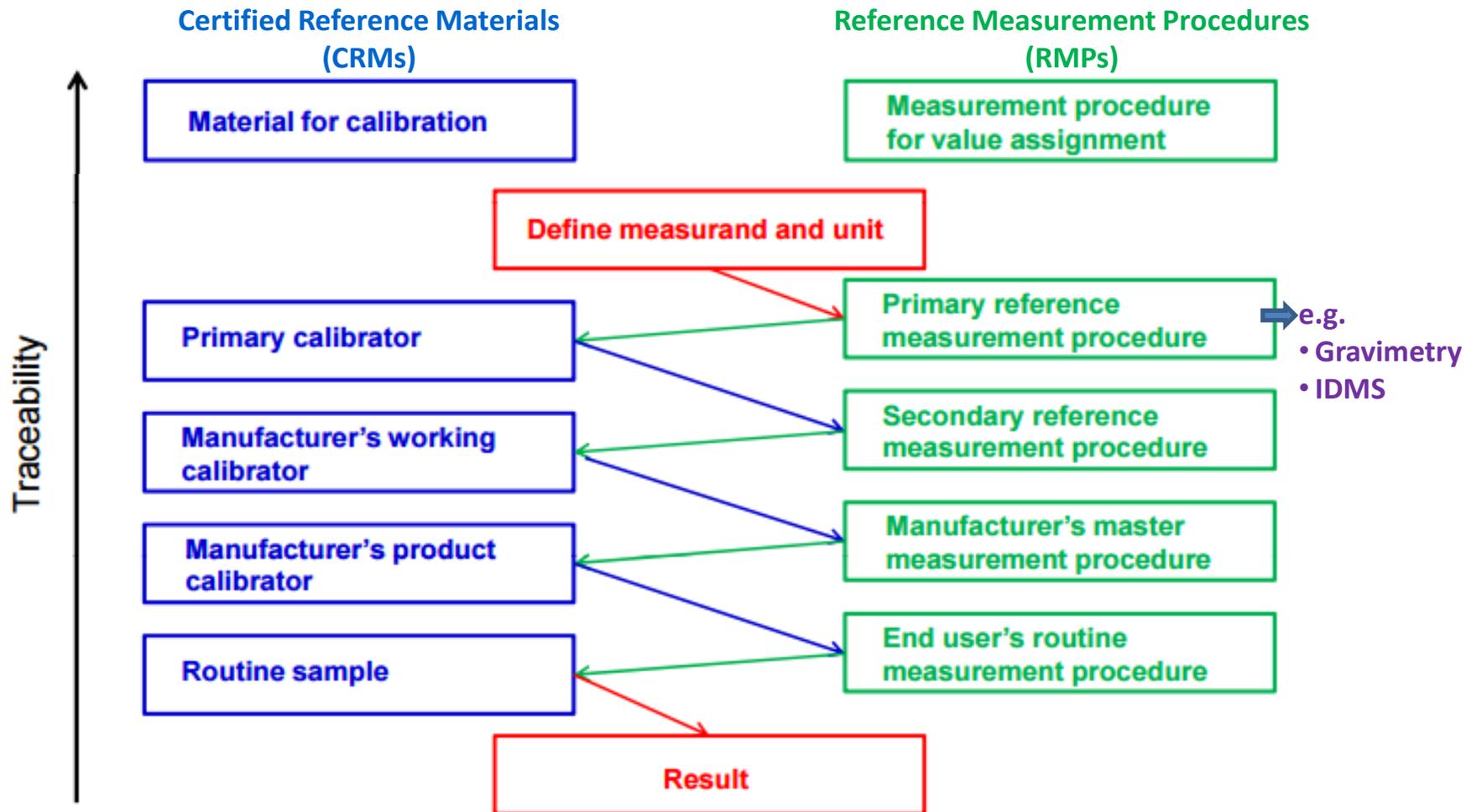
(to cause to conform with a standard)

Requirements:

1. Full Metrological Traceability
 - ✓ Traceability Concept
 - ✓ Reference Measurement Procedure (RMP)
 - ✓ Certified Standard Reference Material (CRM)
2. Commutability
3. Broad Range Coverage

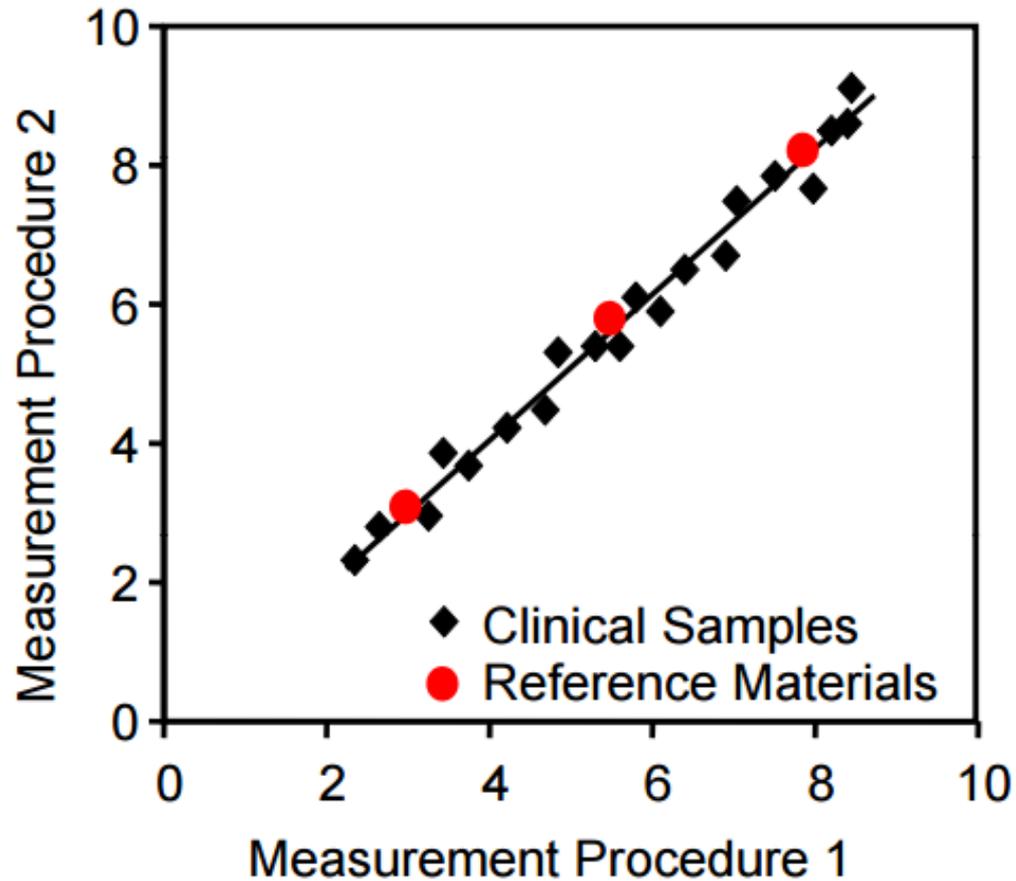
Assay Standardization

(Full Metrological Traceability)



Adapted from EN ISO 17511

Assay Standardization (Commutability)



Miller 2012

Thank You for your Attention



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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 هیپاتیت های ویروسی و اتوایمون	دکتر بابک بلبلی	✓
۹	۱۴۰۱/۱۱/۰۷	آنلاین	اصول تفسیر و چالشهای آزمایشگاهی انواع هیپاتیت ویروسی	دکتر بابک بلبلی	✓
۱۰	۱۴۰۱/۱۱/۰۸	آنلاین	کنترلی کیفیت ابزار پایه در بخش میکروپ شناسی	سرکار خانم صبوریان	✓
۱۱	۱۴۰۱/۱۱/۰۹	آنلاین	کنترل کیفیت در بخش میکروپ 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	✓

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- 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: ۰۲۰۵۰۰۸۸۷ (خط ۱۰)



Lifotronic

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

eCL8000

Electro-chemiluminescence Immunoassay (ECLIA) System



شرکت بنیان درمان
تلفن: ۰۲۰۵۰۰۸۸۷ (خط ۱۰)



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

دیپارتمان آموزش و پژوهش

انجمن علمی دکترای علوم آزمایشگاهی

Education and Research
Department of DCLS
Association of Iran

تشخیص طبی ایران



انجمن علمی دکترای علوم آزمایشگاهی
تشخیص طبی ایران



• Tumor Markers

• Thyroid

• Growth Hormone

• Fertility



• Steroids

• Anemia

• Allergy

• Rheumatology

• Vitamin D

• Infectious Diseases

NEW KITS

ANA AMH dsDNA Folate CCP PTH CA 125 CA15-3 CA19-9

idealdiag.com



هدف ما، ارتقاء فناوری صنعت آزمایشگاهی کشور



امتیازات پیل
کیفیت و دقت
تولید انبوه



www.nouyan-co.com
تلفن: ۰۲۱-۸۸۷۰۳۰۵۰
پست الکترونیک: info@nouyan-co.com

Hipro®

Hipro Biotechnology Co., Ltd

Hurricane POCT Immunoassay System

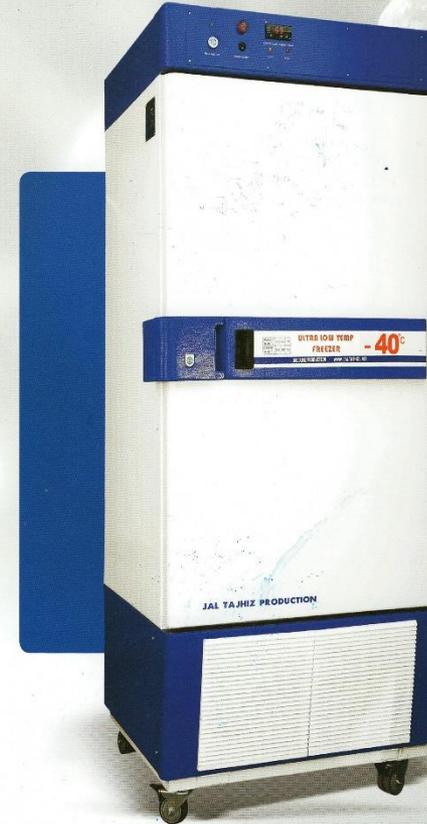


- 4 individual test channels
- Rapid whole blood test
- Simple, Rapid, Accurate
- 3-level Calibration System
Assure reliable and accurate results
- Multi-methodologies

شرکت بنیان درمان
تلفن: ۰۲۱-۸۸۷۰۳۰۵۰ (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



NOUYAN

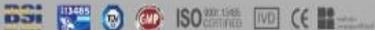
Nouyan nejin parsian Co., PJS

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لطفاً اسکن کنید

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intelligence of the country's lab industry



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شمالی، کوچه نسترن شرقی، پلاک ۴۶
ساختمان نویان نگین پارسیان

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[NOUYAN_NEGIN_PARSIAN](https://www.instagram.com/NOUYAN_NEGIN_PARSIAN)

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