

Thyroid disease for the generalist

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What would you like to know?

- Seeing TFT results through an endocrinologist's eyes
- Acute medicine, TFT abnormal:
 - Clear diagnosis, treat
 - Not sure, refer
 - Non-thyroidal illness ...
- Some cases which could change your practice

Non-thyroidal illness

- Non-thyroidal illness, or sick euthyroid syndrome
- TSH suppressed or slightly raised
- fT4 slightly low - or maybe high
- fT3 typically low

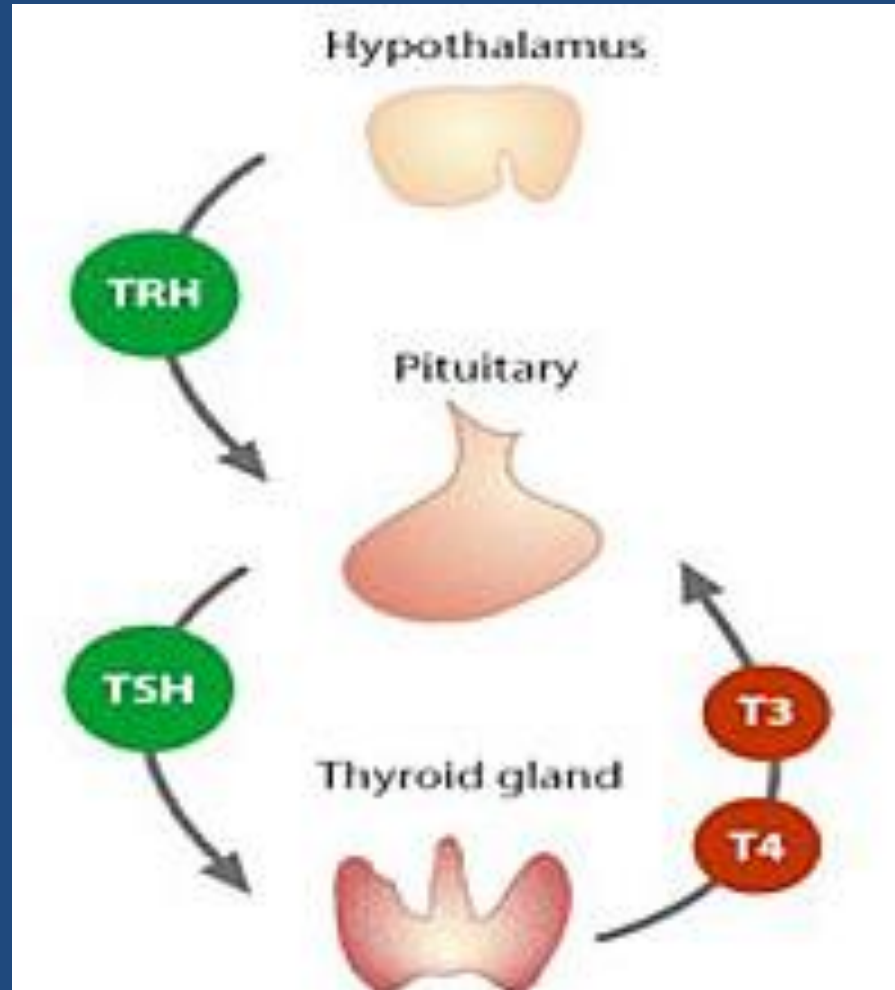
Discordant, no particular pattern

- Include fT3 – if it isn't similar to fT4 ...

consider non-thyroidal illness

Serum TSH: first line test of thyroid function

Serum TSH indicates
the thyroid status
of the tissues

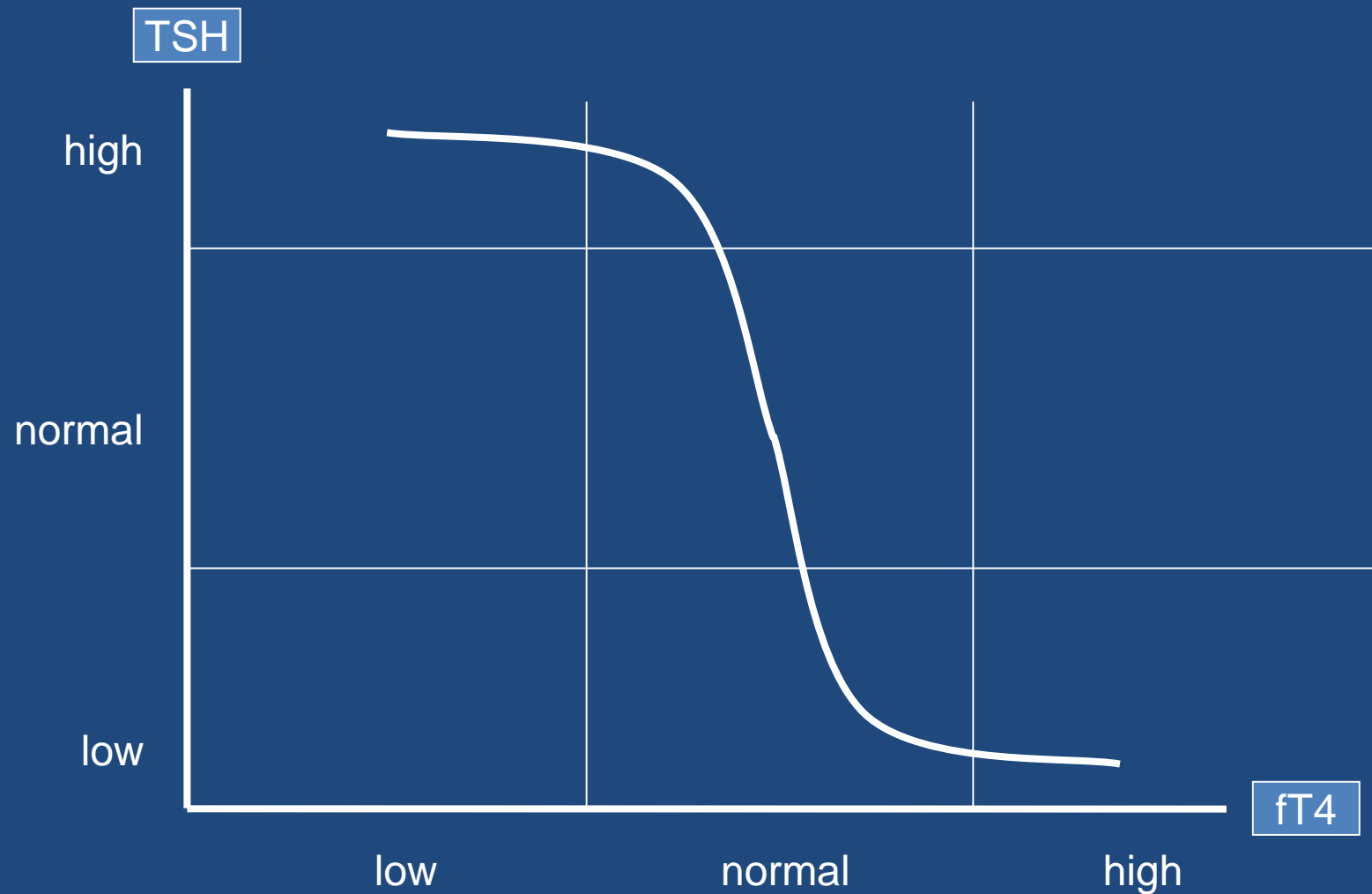


**T3 suppresses
TSH production**

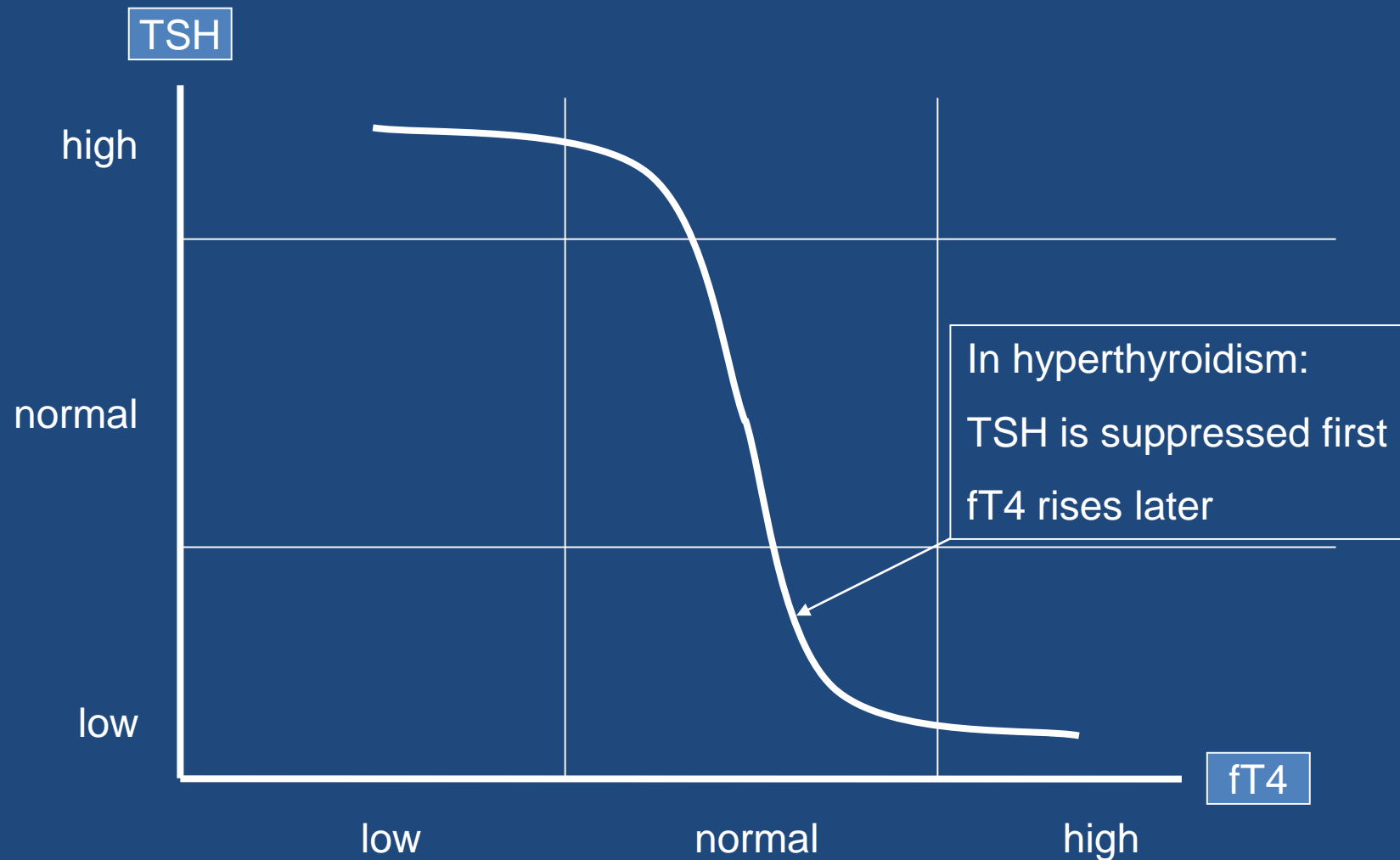
Question:

- In thyrotoxicosis which test result is abnormal first?
 - Suppressed TSH?
 - Raised fT4?
- Answer TSH

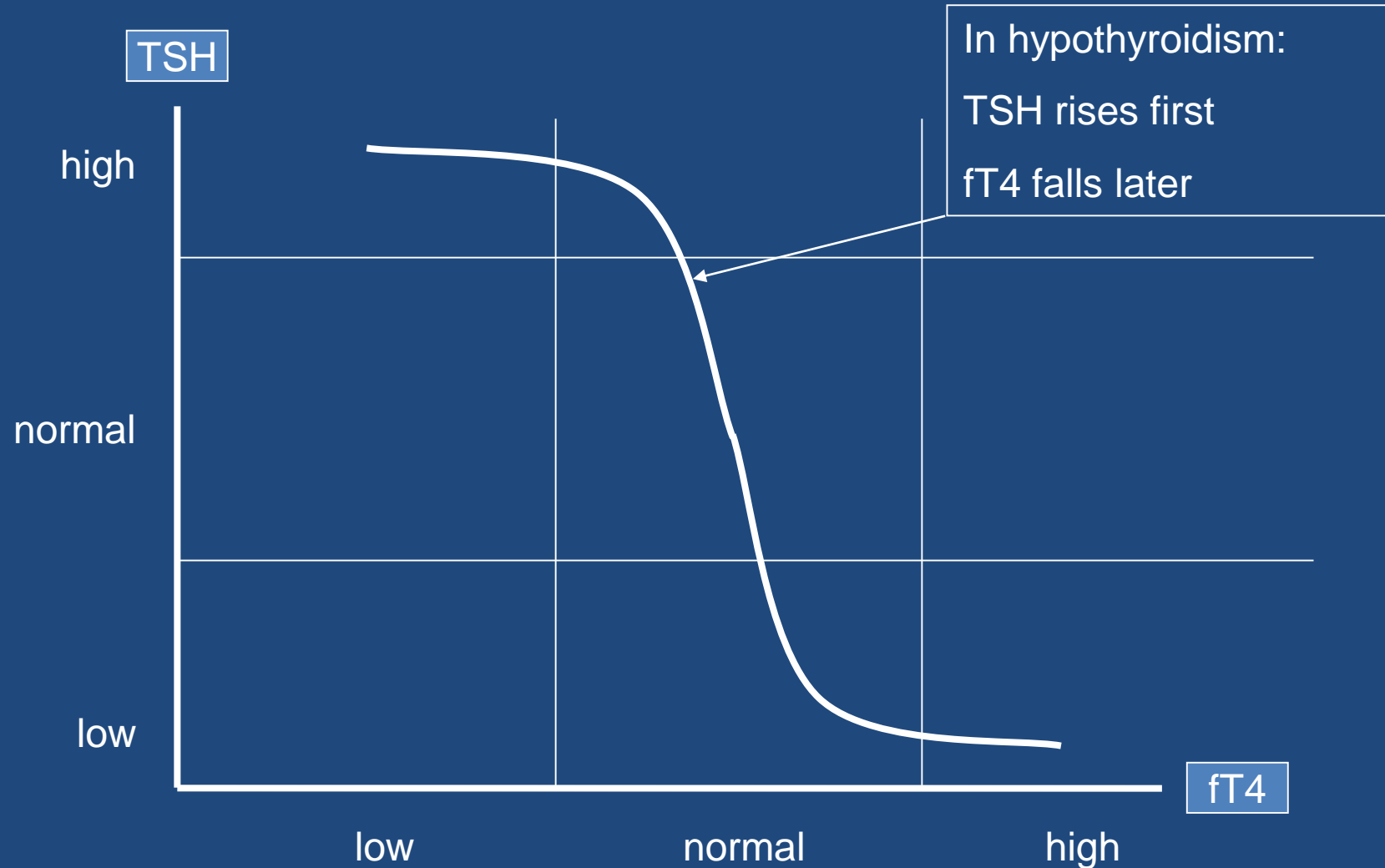
TSH & fT4 in thyroid disease



TSH & fT4 in thyroid disease



TSH & fT4 in thyroid disease



Question:

- In primary hypothyroidism which test result is abnormal first?
 - Raised TSH?
 - Low fT4?
- Answer TSH

The Endocrine Logic

- 46 year old man with erectile dysfunction
- Testosterone 5 nmol/L (10-30) low
- LH 1.2 U/L (1-10) normal
- FSH 1.5 U/L (1-10) normal
- Question: where is the lesion?
- Testicular failure (primary hypogonadism)?
- Pituitary failure (secondary hypogonadism)?

An illustrative case

- 47 year old lady, tired, overweight
- high TSH, low fT4
 - Diagnosis: hypothyroidism
- Easy?

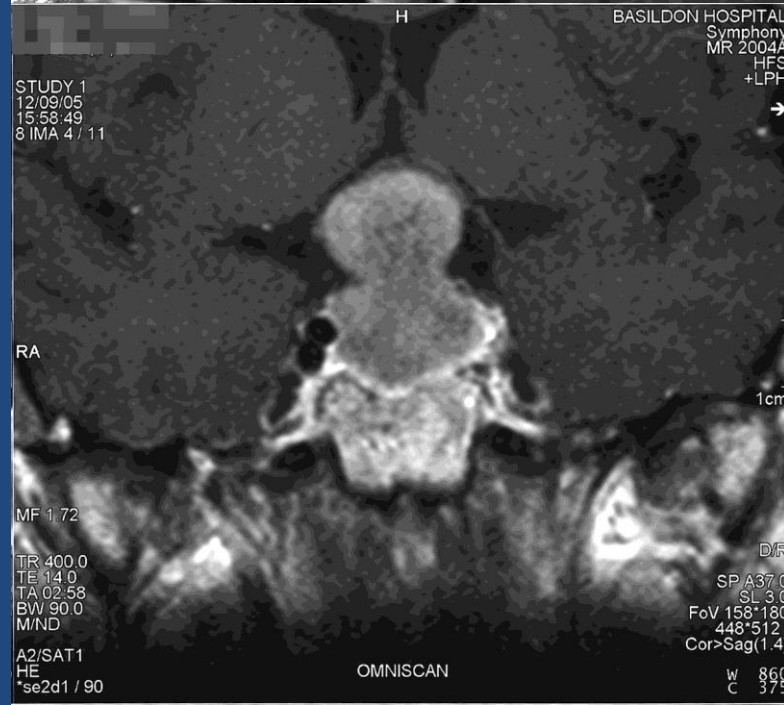
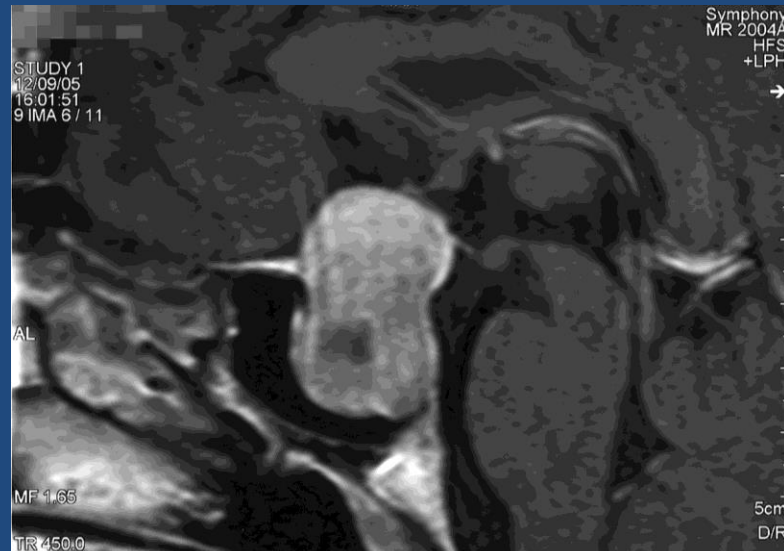
Simple thyroid function?

- 47 year old lady, tired, overweight
- TSH high: 9.08 mU/L (0.28-4.2)
- fT4 low: 6.6 pmol/L (12-23)
- *Diagnosis: hypothyroidism*
- But is this right?

Simple thyroid function?

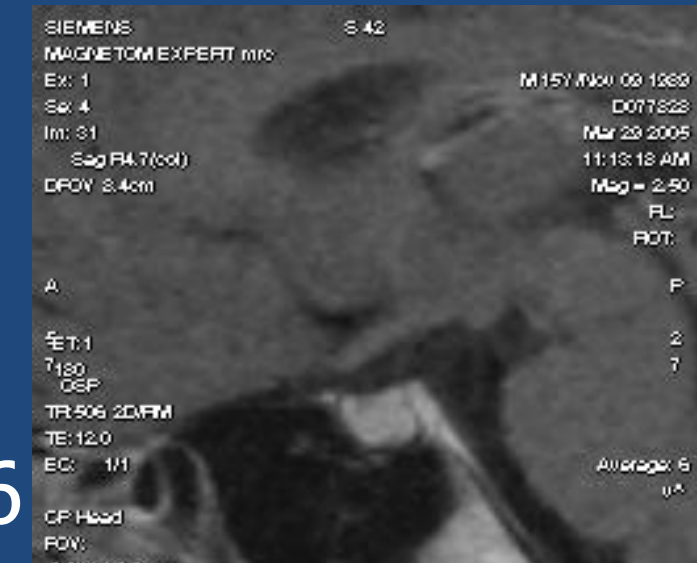
- A year ago: 46 year old, tired, overweight
- TSH high: 5.76 mU/L (0.28-4.2)
- fT4 low: 7.9 pmol/L (12-23)
- TPO positive: >600 U/mL
- *Diagnosis: hypothyroidism*
- Yes, but what else?

Presented to optician



VA right 6/36

VA left HM



Hypothyroidism & hypopituitarism

- TSH high: 9.08 mU/L (0.28-4.2)
 - fT4 low: 6.6 pmol/L (12-23)
 - 9 am cortisol 26 nmol/L (150-650)
 - LH 0.1 U/L (1-10)
 - FSH 1.8 U/L (1-10)
- (on HRT)

Outcome

- Underwent pituitary surgery: chiasm decompressed
 - Vision never really recovered
 - Scan: chiasm remained clear
-
- VA right: hand movements
 - VA left: 6/60
 - ***Registered blind***

Final diagnosis

- Auto-immune hypothyroidism
- Inadequate TSH response to low fT4
- Pan-hypopituitarism
 - Hypothyroidism, partly secondary
 - Amenorrhoea, not menopausal
 - Severe cortisol deficiency
- Pituitary adenoma with loss of vision

What could we have done better?

- Do TSH and fT4 match each other?
- Do they match the clinical picture?

Question:

Which TFT result indicates a diagnosis other than simple primary thyroid dysfunction?

	<i>TSH</i>	<i>free T4</i>
<i>normal</i>	<i>0.28–4.2 mU/L</i>	<i>10–22 pmol/L</i>
A	<0.01 mU/L	37.9 pmol/L
B	<0.01 mU/L	19.2 pmol/L
C	<i>6 mU/L</i>	<i>4.4 pmol/L</i>
D	5.1 mU/L	14.9 pmol/L
E	9.1 mU/L	12.2 pmol/L

Holiday season

- 31 year old woman, tired + various symptoms, to GP
- Twins age 5; working in the City
- TFT:
- TSH 8 mU/L (0.4-5)
- fT4 14 pmol/L (12-23)
- Question: what is the likely diagnosis
 - Primary hypothyroidism
 - Thyrotoxicosis
 - Pituitary dysfunction
 - Some other medical condition

Holiday season

- 31 year old woman, tired
- TFT: TSH 8 mU/L, fT4 14 pmol/L
- Partner saw test result: try levothyroxine
- Worse, dizzy, collapse
- Emergency admission

Emergency admission

- 31 years old, drowsy, hypotensive
- recent hypothyroidism, levothyroxine 5 days
- Diagnosis?
- Treated for myxoedema coma
- Intravenous T3, cardiac arrest
- Full resuscitation, ITU, dialysis 3 weeks
- *Diagnosis: Addison's disease*
- Recovered and went home

Slightly raised TSH

- TSH 8 mU/L, fT4 14 pmol/L
- Compensated hypothyroidism?
- No: Tired, weight loss, dizzy, nausea
- *Addison's disease: slight elevation of TSH*
- *levothyroxine precipitated an Addisonian crisis*
- *'myxoedema coma' IV T3: cardiac arrest*
- *Treated with thyroid hormone and nearly died*

What could we have done better?

- *Q: How do we look at results?*
- Do the tests match each other?
- Do they match the clinical picture?

What could we have done better?

- How do we look at results?
- To interpret the result –
you have to know the question
- Sometimes a 'normal' or 'borderline' result can be serious

Friday afternoon case

- 74 year old lady admitted for investigation
 - 4 stone weight loss, marked diarrhoea
 - TSH <0.01 mU/L
 - fT4 >80 pmol/L, fT3 >10 pmol/L
 - Thyrotoxicosis?
-
- Sitting at the bedside ...

Friday afternoon case

- 74 year old lady admitted for investigation
- 4 stone weight loss, marked diarrhoea
- TSH <0.01 mU/L
- fT4 >80 pmol/L, fT3 >10 pmol/L
- Thyrotoxicosis?
- *She just looked too well*
- *Total T4 was 104 nmol/L (70-140), normal*
- *Fluorescein angiogram ...*

Call to antenatal ward

- 24 years old, 1st pregnancy, 10 weeks gestation
- Vomiting, tachycardia
- P 110 regular, slight tremor
very slight diffuse goitre, normal eyes
- TSH 0.01 mU/L, fT4 26 pmol/L, fT3 7.8 pmol/L
- Diagnosis?

Hyperthyroidism in early pregnancy

- Gestational thyrotoxicosis
 - Very high hCG level, mimics TSH
 - Hyperemesis and hyperthyroidism
 - Settles without treatment
-
- Diagnosis could be Graves' disease in early pregnancy
 - Don't treat: call endocrinology

Summary

- TSH: a marker of thyroid status
(assuming normal pituitary function)
- Some TFT results are discordant: don't just treat the number
- Look at the test results and remember the original question
- Where TFT are discordant or don't match the patient - take advice

Overall themes:

- Diagnosis might be more subtle than looking at the test result
- Look at the patient: does the test fit?
- The best test? Physician's clinical insight