A 45 year old man notices a gradual decrease in the frequency with which he experiences sexual excitement and is concerned that his sexual performance is less satisfactory to both him and his wife than previously. Three months later he begins to notice a gradual feeling of "coldness" and diminished mental sharpness accompanied by a transient increase in weight and decrease in the frequency of bowel movements. One month before being seen, he notes a significant decrease in appetite, increasing episodes of lightheadedness and an increasing feeling of profound fatigue. On the day he seeks medical advice he notes a bad headache and the feeling that he is viewing life with blinders on. On physical exam, he is noted to have postural blood pressure changes, a pale and pasty skin color, bilateral visual field defects, ptosis of the left eyelid and compromised extra-ocular movements of the left eye. Further examination reveals no thyroidal enlargement but his testicles seem to be smaller and softer than expected.

1. Which of the following would likely be encountered in this individual's "Pituitary function tests"

A. LH low, Free Testosterone high; TSH low, Free T4 low; ACTH low, Cortisol low
B. LH high, Free Testosterone low; TSH low, Free T4 low; ACTH low, Cortisol low
C. LH low, Free Testosterone low; TSH low, Free T4 low; ACTH low, Cortisol low
D. LH low, Free Testosterone low; TSH high, Free T4 low; ACTH high, Cortisol low
E. LH low, Free Testosterone low; TSH low, Free T4 low; ACTH high, Cortisol low

2. Which of the following best explains the patient's complaints of visual problems and the physical findings associated with the cranial nerve deficits.

A. Both findings are typical of patients suffering from secondary hypogonadism and are therefore hormonally induced.
B. A direct effect of pressure on nerves within the CNS
C. An indirect effect of primary hypothyroidism also typically seen in patients with Hashimoto's Thyroiditis
D. An effect of autoimmune phenomena associated with the presence of Graves' disease
E. Purely psychological as a result of the conflict that his sexual performance causes in his marriage

3. If the patient is subsequently found to be growth hormone deficient, the optimal treatment would be:

A. Pulsatile gonadotropin releasing hormone (GnRH)
B. A somatostatin analog
C. Insulin like growth factor – 1 (IGF-1)
D. Growth hormone releasing hormone (GHRH)
E. None of the above
A 25-yr. old man presents with facial swelling and new-onset acne. He reports a 20-lb. weight gain over four months despite no change in his diet or activity.

4. Of the following, the most appropriate first test would be:
   F. Random cortisol level
   G. Fasting DHEA sulfate level
   H. Overnight 1 mg Dexamethasone suppression test
   I. 24 hour urine collection for aldosterone
   J. Cortrosyn stimulation test

5. Once the diagnosis is established, the finding of a suppressed ACTH level suggests the cause is most likely to be:
   A. Adrenal tumor
   B. Pituitary adenoma
   C. Small cell lung cancer
   D. Hypopituitarism
   E. Hypothalamic lesion

6. If the patient’s disorder is not surgically curable, potential medical treatments would include all of the following except:
   ✓ A. Mitotane
   ✗ B. Metyrapone
   C. Ketoconazole
   D. Aminoglutethimide
   E. All of the above
The photo below is of a mass in the adrenal cortex. A small amount of residual atrophic cortex can be seen on the upper margin. The cut surface of the mass felt greasy it appears fatty.

Answer true (A) or false (B) for each of the following: (1 point each)
7. Benign histological features in an adrenal tumor are a reliable indicator of benign clinical behavior
8. An adrenal adenoma or adenocarcinoma is always responsible for primary hyper-adrenalism whereas primary aldosteronism is always due to adrenal hyperplasia
9. The zona glomerulosa is the site of production of aldosterone
10. The tumor shown above cannot be malignant because it is less than 5 cm in greatest dimension
11. The other adrenal gland in this patient was probably atrophic
After an uneventful 38-week pregnancy, Mrs. M gives birth to a 3.3-kg baby boy. APGAR scores at the
time of birth were within normal limits and he appeared to be doing well at discharge on day two. On day 5
his newborn screening test results returned indicating that he was hypothyroid. On examination on day 6 he
is noted to be feeding well, had a normal temperature was vigorous and alert weighing 3.15 kg. Thyroid
function tests are redrawn to confirm the diagnosis and gain insight into the potential etiology of his
hypothyroidism.

12. Which of the following may be a responsible defect in a child with congenital hypothyroidism?

A. A defect in the gene coding for thyroglobulin
B. A defect in the gene coding for thyroid peroxidase
C. A defect in the gene coding for the sodium iodide symporter
D. A defect in the gene coding for the thyrotropin (TSH) receptor
E. A defect in any of the genes listed above

13. When the thyroid function tests return a diagnosis of primary hypothyroidism is made. Which of the
following sets of thyroid function parameters is consistent with the presence of primary
hypothyroidism?

A. TSH normal Free thyroxine elevated Free triiodothyronine low
B. TSH low Free thyroxine low Free triiodothyronine low
C. TSH elevated Free thyroxine low Free triiodothyronine low
D. TSH normal Free thyroxine elevated Free triiodothyronine elevated
E. TSH low Free thyroxine low Free triiodothyronine elevated

14. For the typical person with primary hypothyroidism, which of the following treatment formulations is
generally recommended?

A. Combined L-T4 and L-T3
B. L-T4
C. L-T3
D. Thyroglobulin
F. TSH
A 19-year-old female college student is brought to the Emergency Room by her roommate. She reports that she has been feeling weak and lethargic for about a week. This has progressively worsened and, for the past 2 days, she has had nausea and vomiting. She did not receive the influenza vaccine offered by her college health service, and multiple students with presumed influenza have been seen in the ER during the past 3 weeks. On review of systems by the ER physician, a history is obtained indicating that the patient noted progressively increasing thirst starting approximately one week ago and has been passing large volumes of urine, which require her getting up several times during the night. Questions regarding the family history reveal that the paternal grandmother developed diabetes at approximately age 60, for which she takes pills and has been placed on a diet. There is no other family history of diabetes.

On examination, the patient is noted to be somnolent but responsive to questions. The vital signs are:
- Pulse: 140 and regular
- BP: 110/60
- Respiratory rate: 23/minute with deep inspiration and expiration.
- Temperature: 37°C

Her breath is noted to have a fruity odor.

Initial laboratory findings include:
- Blood glucose: 650 mg/dl
- Serum ketones: large
- Arterial pH: 7.20

15. The most likely diagnosis to explain the metabolic state of this patient is:
   A. Influenza
   B. Type 1A diabetes
   C. Type 1B diabetes
   D. Type 2 diabetes
   E. MODY diabetes

16. The best test to confirm the specific disease responsible for the metabolic abnormalities in this patient would be:
   A. A rapid influenza test
   B. Serum titers of anti-insulin, anti-GAD, and anti-islet antibodies
   C. A determination of plasma hemoglobin A1c (HbA1c)
   D. A plasma insulin level
   E. A glucose tolerance test

17. Standard management of the patient’s condition would include all of the following except:
   A. Bicarbonate
   B. Intravenous fluids
   C. Insulin
   D. Potassium
   E. Diet and exercise planning as an outpatient
It is not appropriate to obtain tissue samples from this patient. However, if tissue sections of her pancreas were examined microscopically, it would probably have this histological appearance:

![Histological Appearance of Pancreas](image)

**18. All of the following statements are true except:** (5 points)

- A. The infiltrating cells are predominantly T lymphocytes
- B. The distribution of insulitis may be strikingly uneven
- C. EM would likely show β-cell degranulation
- D. Identical findings would be present in the pancreas of an infant of a diabetic mother
- F. Reduction in number and size of islets might be noted
A 60-year old male presents with fatigue, easy exhaustion, constipation, and proximal muscle weakness. During the past 8 years, he has spontaneously passed several calcium kidney stones. He was taking no medications. Physical examination was unremarkable except for conjunctival injection. Laboratory test results were as follows:

- BUN 20 mg/dl (10-20)
- Creatinine 1.1 mg/dl (0.5-1.5)
- Albumin 4 gm/dl (3.6-4.5)
- Calcium 11.8 mg/dl (8.9-10.2) ↑
- Phosphate 2.5 mg/dl (2.8-4.5) ↓
- Liver enzymes normal
- Intact PTH 102 pg/ml (20-65) ↑
- DXA BMD consistent with osteopenia

19. The most likely diagnosis in this patient is
A. Milk alkali syndrome
B. Vitamin D intoxication
C. Humoral hypercalcemia of malignancy
D. Hyperthyroidism
E. Primary hyperparathyroidism

20. Appropriate therapy for this patient would be
A. Bisphosphonate therapy
B. Calcitonin therapy
C. Low calcium diet
D. Neck exploration
E. High phosphate diet
A patient with clinically proven hyperparathyroidism was subjected to neck exploration. A solitary 1.0-cm discrete mass was found in the right lower parathyroid gland. The other 3 glands were small and difficult to find. A section is shown below.

Match the letters (A-E) with the features below; give one best answer for each; use each letter only once. (1 point each)

A. Parathyroid adenoma
B. Parathyroid hyperplasia
C. Parathyroid carcinoma
D. Brown tumors
E. Hypoparathyroidism

21. May exceed 10 grams in weight; clinical behavior does not correlate well with cytological detail.
22. The lesion shown in the above photo; predominantly composed of chief cells.
23. A complication of thyroidectomy
24. Aggregates of osteoclasts, reactive giant cells, and hemorrhagic debris
25. Microscopically, mainly chief cell hyperplasia; may be part of an MEN syndrome.
A 53-year-old woman with a family history of osteoporosis presents having not had a period for 2 years.

26. Prescribing her HRT will help with which of the following EXCEPT:
   - A. Her risk of a bone fracture
   - B. Her risk of a cardiovascular event
   - C. Any symptoms of hot flashes
   - D. Her risk of colon cancer
   - E. Lowering LDL cholesterol

Prior to initiating any treatment, you obtain a DXA bone scan, which reveals osteoporosis

27. Options for FIRST line treatment, in the absence of other factors in this asymptomatic woman include all of the following EXCEPT:
   - 1) Exercise
   - 2) Calcium supplementation
   - 3) Bisphosphonates (e.g. Alendronate)
   - 4) HRT
   - 5) SERM’s (e.g. Raloxifene)
25-year-old female presents to the ER with nausea, vomiting, and abdominal pain radiating to the back consistent with pancreatitis. Past medical history is negative for alcohol use and gallstones. She recently started ethinyl estradiol and norethindrone for contraception. Physical exam is unremarkable except for tenderness to palpation in the mid-epigastric region and pustular lesions over her thigh and extensor surface of her arms consistent with eruptive xanthoma.

28. The predominant lipoprotein abnormality in this patient involves
   A. Chylomicrons
   B. Intermediate density lipoprotein
   C. Low density lipoprotein
   D. High-density lipoprotein
   E. Lipoprotein (a)

29. Plasma lipid profile that best describes this patient
   A. Elevated Total Cholesterol
   B. Elevated Triglyceride
   C. Elevated Low density lipoprotein
   D. Low High-density lipoprotein
   E. Elevated Lipoprotein (a)

30. The underlying genetic disorder of lipoprotein metabolism is secondary to
   A. Deficiency of Lipoprotein Lipase
   B. Defects in the gene that encodes the LDL receptor
   C. Defect in apo B-100 ligand
   D. Deficiency of cholesteryl ester transfer protein
   E. Deficiency of acyl Co A: cholesterol acyl transferase

31. Estrogen therapy can precipitate pancreatitis by
   A. Increasing acyl Co A: cholesterol acyl transferase activity
   B. Increasing Lipoprotein Lipase Activity
   C. Increasing Apo AI catabolism
   D. Increasing hepatic production of VLDL

32. The first step in addressing the lipid abnormality seen in this patient
   A. Low fat diet and discontinue estrogen
   B. Nicotinic Acid
   C. Fibrin Acid
   D. HMG CoA Reductase Inhibitors
   E. Bile Acid Resin
A 32-yr/o man presents for evaluation of a six-month history of decreased energy levels, decreased libido, and erectile function. He finds that he tires more easily in the gym and is often unable to complete his normal workout. He has been married for 6 years and he and his wife are trying to start a family. He feels under a lot of stress, and he has difficulty maintaining an erection that is adequate for intercourse. He has no history of cryptorchidism, microphallus, or anosmia, and had a normal puberty. He has no breast tenderness, headaches, or visual field abnormalities. He reports that he is not taking any medications or dietary supplements. His family history is negative for delayed puberty, hypogonadism, or anosmia, but is positive for hypothyroidism in his mother.

On examination, he is a healthy, fit, adult male. His height is 72” with an arm span of 71” and a weight of 180 lbs. He has no goiter and is well virilized with normal facial, axillary, and pubic hair. He has no gynecomastia and his testicular volume is 15 ml. Fundoscopic exam is normal and visual fields are full to confrontation. He is referred to you because his primary physician obtained a testosterone level of 41 ng/dL (nl 250-850).

33. Which of the following tests would be the most helpful initial approach to providing insight into the pathophysiology of this patient’s problem?

A. TRH stimulated Prolactin measurement  
B. Pituitary MRI scan  
C. LH/FSH levels  
D. TSH  
E. Semen analysis

34. Which of the following treatments might result in restored fertility?

A. hCG injections  
B. Testosterone injections  
C. Transdermal testosterone  
D. Pulsatile GnRH subcutaneously with an exogenous pump  
E. Viagra
A 31 year old woman is seen by her primary care physician for a routine visit and gynecological exam. She has a history of being “heavy” since adolescence. She delivered her second child 2 years previously and comments to her physician that she “never lost the weight” after that pregnancy and has gained weight since. She is 5 feet 4 inches tall and weighs 180 lbs. (BMI 30.9 kg/m²). She works as a secretary and does not regularly exercise. Her medical history and review of systems are otherwise unremarkable.

35. Her body weight status would be classified as:

A. Normal weight for height
B. Overweight
C. Obesity
D. Morbid obesity
E. None of the above

36. Her body weight status is associated with an increased risk of:

A. Diabetes mellitus
B. Osteoarthritis
C. Breast cancer
D. A, B, and C above
E. A and B above, but not C

37. Recommendations for weight management intervention at this time should include:

A. No intervention; the patient has no weight related comorbid conditions at this time.
B. A prescription for Sibutramine 15 mg. P.O., q.d. with recommendations for caloric restriction and follow-up appointment in 4 weeks.
C. Recommendations including caloric restriction, nutritional education, behavioral strategies and increased physical activity.
D. Further evaluation to determine if a pharmacologic agent such as Sibutramine or Orlistat might be indicated at this time.
E. C and D.
A 22 year old man presents with testicular enlargement and gynecomastia. Serum human chorionic gonadotrophin (hCG) is elevated. Tissue from a testicular biopsy (below) shows syncytiotrophoblast and cytotrophoblast:

![Image of tissue sample]

38. The diagnosis is: (5 points)

A. Seminoma  
B. Choriocarcinoma  
C. Embryonal carcinoma  
D. Yolk sac tumor  
E. Metastatic osteoblastic sarcoma

Match A-E (below) with listed structures:

39. Hypopituitarism  
40. Growth hormone adenoma before epiphyseal closure  
41. Growth hormone adenoma after epiphyseal closure  
42. Craniopharyngioma  
43. Sphenoid sinus

A. Gigantism  
B. Used in surgical approach to pituitary gland  
C. Occurs when at least 70% of parenchyma is lost/absent  
D. Derived from Rathke’s pouch remnants  
E. Acromegaly
A 33 year old woman who has been married for 7 years, presents to your practice upon referral of an urgent care MD in the community. She has a 4 year old child, used oral contraceptives until recently but has been trying to conceive for the past three months without success. As she is new to the area she stops by an urgent care center to initiate medical contact and undergoes a history and physical exam. As part of this evaluation she has a brain MRI ordered that reveals a 0.9 cm pituitary "lesion" said to be consistent with an adenoma.

44. In regard to pituitary lesions found in the course of evaluation which of the following statements are true?

A. Micro-adenomas of the pituitary may be found in 30% of unselected pituitary glands examined at autopsy
B. Less than 1% of MRI examinations of the pituitary reveal the presence of unsuspected lesions suspicious for the presence of an adenoma
C. All lesions identified on MRI in the pituitary require surgical pathology confirmation as a high percentage are caused by malignant tumors
D. Pituitary adenomas are almost always hormonally active and cause clinical symptoms that direct further clinical evaluation
E. Unless accompanied by obvious clinical symptoms small pituitary lesions are of no consequence and therefore require no evaluation

45. An appropriate endocrine work up of a patient with the MRI lesion listed above may include all of the above EXCEPT:

✓A. The measurement of a TSH and Free T4
✓B. The measurement of a prolactin level
✓C. The performance of an overnight dexamethasone suppression test
✓D. The measurement of an LH and Testosterone level
E. The measurement of an IGF-1 level

46. The most common pituitary tumor to cause infertility in females is best treated with:

✓A. A dopamine agonist
B. A somatostatin analog
C. Continuous gonadotropin releasing hormone
D. A dopamine antagonist
E. An LH receptor antagonist
The sagittal section below is from an elderly woman who presented with weakness and an altered mental status.

Answer true (A) or false (B) for the following statements: (1 point each)

47. This pituitary adenoma extends beyond the confines of the sella turcica
48. It could not have been functional because the woman was postmenopausal
49. It might have resulted in hypofunction of the adrenal glands and/or the thyroid gland
50. Pituitary apoplexy refers to a situation in which there is acute hemorrhage into an adenoma
51. Careful examination in this case is likely to have shown visual field defects
A 34 year old woman is noted to have a blood pressure of 170/100 on a routine exam. She is otherwise well and has no prior history of hypertension. There is no family history of hypertension. Her blood pressure proves difficult to control despite multiple antihypertensive agents.

52. Support for mineralocorticoid excess as a cause of her hypertension might include the finding of which of the following on laboratory studies:
   A. Hyperkalemia
   B. Hypokalemia
   C. Hypermagnesemia
   D. Hyponatremia
   E. Elevated Renin level

53. Biochemical screening for mineralocorticoid excess generally includes
   A. Plasma aldosteron concentration
   B. Plasma renin activity
   C. ACTH stimulation testing
   D. Both (a) and (b)
   E. Neither (a) nor (b) nor (c)

54. Medical management of mineralocorticoid excess is most likely to include
   A. Spironolactone
   B. Fludrocortisone
   C. Dexamethasone
   D. Hydrocortisone
   E. Amiodarone
A 50 year old woman visits your office to complete her annual physical. She complains of a five pound weight gain over the preceding year, a sensation of coldness, a lack of energy and says that she has been told that she has been snoring over the past 6 months. On physical examination her blood pressure is mildly elevated at 135/90, she has some puffiness around her eyes and is noted to have a readily palpable thyroid which is estimated to be about two times normal size and was firm in consistency.

55. Laboratory testing demonstrates a TSH level of 24 mIU/ml (nl 0.5 - 2.5) and a free thyroxine value of 0.4 ug/dl (nl 0.8-1.8). Which of the following is a potential mechanism for this patient's problem?

A. A pituitary tumor producing TSH
B. A hypothalamic lesion disrupting TRH production and release to the pituitary
C. Stimulating antibodies directed at the TSH receptor
D. A mutation in the TSH receptor resulting in continuous activation of cAMP
E. An overdose of iodine ingested in the form of a super saturated potassium iodide taken to deal with a chronic cough

56. The most common cause of hypothyroidism, which could account for the patients presentation is Hashimoto's thyroiditis. Which of the following best describes the pathophysiologic basis of this condition.

A. A neoplastic infiltration of the hypothalamus interrupting the synthesis and release of TRH
B. An inflammatory process in the Pituitary resulting in thyrotroph cell apoptosis
C. A defect in the paired homeobox-8 gene resulting in a hypoplastic thyroid
D. Selective inhibition of the sodium iodide symporter (NIS) by a circulating Ig-A antibody
E. A CD8+ mediated cytotoxicity resulting in thyroid follicular cell apoptosis

57. In patients with Graves Disease, treatment with I-131 (radioiodine) can cause hypothyroidism. Which of the following statements about radioiodine treatment for Graves Disease is false?

A. More than one dose of I-131 may be necessary
B. No increased cancer risk has been documented
C. No genetic damage has been documented
D. It is the treatment of choice in children and adolescents
E. It has no documented effect on fertility
This tissue is from a 40 year old woman with primary thyroid hypofunction. She has a family history of hypothyroidism and is HLA-DR5 positive.

Answer true (A) or false (B) for each of the following statements: (1 point each)

58. Hurthle cells are present
59. This disease is also known as subacute thyroiditis
60. There is a lymphocytic infiltrate with germinal centers
61. Hypothyroidism may be preceded by transient thyrotoxicosis
62. Most patients with this disorder have autoantibodies to thyroglobulin
A 26 year old woman is seen for a routine primary care examination. During the interview, she mentions that her sister was diagnosed with diabetes at age 22. Her sister was acutely ill and hospitalized for several days at the time of her diagnosis. Since then she has taken insulin. Once, she stopped her insulin and had to be admitted to a hospital with some kind of "coma".

63. The 26 year old patient (not the sister with diabetes) would like to know her risk of developing diabetes, since her younger sister has developed the disease as described above. In the absence of other first degree relatives with diabetes, her statistical risk is closest to which of the following:

A. 0.5%
B. 5%
C. 10%
D. 50%
E. 90%

64. If the sister with diabetes were a monozygotic twin, the risk of the patient developing diabetes would be closest to which of the following:

A. 0.5%
B. 5%
C. 10%
D. 50%
E. 90%
A 42-year old woman presented with longstanding tingling and numbness of her hands and fingers, intermittent leg cramps, and spasm of the muscles of her hands. Fifteen years ago, she had neck surgery for removal of a multinodular goiter. Physical examination was positive for bilateral cataracts and positive Chvostek and Trousseau signs. Laboratory test results were as follows:

- BUN 20 mg/dl
- Creatinine 1.0 mg/dl
- Albumin 4 gm/dl
- Calcium 7.0 mg/dl
- Phosphate 5.0 mg/dl
- 1.25-OH-D 20 pg/ml (15-60)
- 25-OH-D 30 ng/ml (15-80)
- PTH 10 pg/ml
- Mg 2.5 mg/dl (1.8-3.0)

65. The most likely diagnosis in this patient is
A. Vitamin D deficiency
B. "Bone hunger"
C. Hypomagnesemia
D. Hypoparathyroidism
E. Pseudohypoparathyroidism

66. The most appropriate treatment would be
A. Magnesium supplements
B. PTH injections
C. Thiazide diuretic
D. Vitamin D
E. Calcium gluconate 1 gm daily
A 29 year old presents with the following appearance and symptoms which make you suspect an androgen producing ovarian tumor.

67. Which of the following would NOT be consistent with your concern?
A. The temporal balding noted above
B. Deepening of the voice
C. Rapid onset of symptoms of hirsutism
D. Hot flashes
E. Increased libido

68. Which of the following hormones would you most expect to be elevated if this is an ovarian tumor?
A. Androstenedione
B. Testosterone
C. Follicle Stimulating Hormone (FSH)
D. Cortisol
E. Dehydroepiandrosterone Sulfate (DHEA-S)
45-year-old man presents to your office secondary to an abnormal cholesterol panel. His past medical history is significant for a CABG at age 42 and hypothyroidism. He had been prescribed several pills for his medical problems, but ran out of his prescriptions several months ago. Physical exam is unremarkable except for enlarged thyroid, palmar xanthomas, delayed deep tendon reflexes and diminished pulses in his lower extremity.

69. The predominant lipoprotein abnormality in this patient involves
A. Very low density lipoprotein
B. High-density lipoprotein
C. Intermediate high density lipoprotein
D. Lipoprotein (a)
E. Lipoprotein (b)

70. Plasma lipid profile that best describes this patient
A. High total cholesterol, high triglyceride
B. High total cholesterol, low triglyceride
C. High total cholesterol, normal triglyceride
D. Normal total cholesterol, high triglyceride
E. Normal total cholesterol, low triglyceride

71. The genetic disorder of lipoprotein metabolism is secondary to
A. Defect in apo E
B. Defect in apo CII
C. Defect in apo B-100
D. Defect in apo B-48
E. Defect in TSH receptor

72. Hypothyroidism can precipitate lipid abnormalities by
A. Increased LDL receptor expression and decreased Lipoprotein lipase activity
B. Decreased LDL receptor expression and decreased Lipoprotein lipase activity
C. Decreased LDL receptor expression and increased Lipoprotein lipase activity
D. Increased LDL receptor expression and increased Lipoprotein lipase activity
E. Increasing conversion of cholesterol to bile

73. The first step in the treatment of this patient
A. Establish a euthyroid state
B. Establish a thyrotoxic state
C. Encourage strict diet high in saturated fat
D. Encourage strict diet of carbohydrate restrictions
E. No intervention required
A 75 y/o man is referred for evaluation of erectile dysfunction (ED). He has experienced increasing difficulty achieving erections over the past 5 years. He is happily married and has a normal libido. His past history is notable for diabetes for the past 9 years, controlled with diet, and benign prostatic hyperplasia (BPH), for which he is being treated with an alpha adrenergic blocker. He is taking no other medications.

On physical examination he has a body mass index (BMI) of 23 kg/m2 and a BP of 140/90. He is well virilized with no gynecomastia and has a testicular volume of 20 ml. Rectal examination demonstrates a mildly enlarged prostate. He has normal pedal pulses and no evidence of neuropathy.

Laboratory testing reveals the following: testosterone = 167 ng/dL and 205 ng/dL (280-1050) on two occasions; LH = 9 mIU/ml (3-15); FSH= 12.3 mIU/ml (3-18); and a prolactin= 4.9 ng/ml (5-20) His Hematocrit= 36.8% with normal indices. Prostate Specific Antigen (PSA) =0.2 ng/ml (> 4.0) and HbA1C=6.0% (3.5-5.5). bone densitometry (DXA) demonstrates a T score of -2.2 at the L-S spine (-1.0) and -2.1 at the hip (<-1.0).

74. What is the most likely cause of this patient's ED?

A. Hypogonadism
B. Diabetic neuropathy
C. Vascular disease
D. Anemia of chronic disease
E. Possible contribution of several or all of the above.

75. What treatment options would you propose?

A. Testosterone injections.
B. Phosphodiesterase inhibitors (Viagra/Levitra/Cialis)
C. Transdermal testosterone
D. Transbuccal testosterone
E. Combination of testosterone replacement and PDE inhibitor.

76. If testosterone is given, which of the following is not usually followed clinically?

A. PSA
B. Lipids
C. CBC
D. LFT's
E. DXA
A 15 year old boy is evaluated for obesity. He is 5 feet 9 inches tall and weighs 236 lbs. (BMI 35 kg/m²). He has no siblings, but both parents are mildly obese. His developmental milestones have been normal except for obesity. He is an excellent student without a history of social problems. He eats three meals per day and usually snacks after school and in the evening. He reports that his major leisure activity is playing computer games, and he is a nationally ranked competitor on two on-line games.

77. The most likely etiology of this patient's obesity is:
A. A leptin mutation
B. A melanocortin-4 receptor mutation
C. A low basal metabolic rate
D. Combined genetic and environmental factors
E. The hypothalamic-keyboard syndrome

78. If he were found to have a single gene mutation, possibilities would be:
A. An inactivating mutation of leptin
B. An activating mutation of leptin
C. An inactivating mutation of the melanocortin-4 receptor
D. A or C above
E. B or C above

79. The following are true regarding the weight and health of this patient:
A. Although the patient is overweight, this is of no real concern because he has not yet gone through his growth spurt, which will likely normalize his weight.
B. The pediatrician should address potential weight related health concerns and appropriate weight management interventions with the patient and his parents.
C. Given there is a strong genetic component contributing to the weight problem, the most appropriate first line of treatment for this patient is a pharmacologic approach.
D. Nutritional education with severe caloric restriction should be an important component of the recommended weight management intervention for this patient.
E. B and D
80. All of the following are thought to play a role in the pathogenesis of the complications of diabetes mellitus except: (5 points)

A. Increased intracellular osmolality with water influx ✓
B. Accumulation of irreversible advanced glycosylation end products (AGE) ✓
C. Injury of cells by fructose which is then converted into
   glycolate \( \rightarrow \text{glycolate} \)
D. AGE cross-links in collagen trapping plasma or interstitial proteins ✓
E. Albumin binding to glycosylated basement membrane in capillaries True

81. True (A) or false (B) (1 point each)
   Phaeochromocytoma

Phaeochromocytoma is a tumor of the adrenal medulla, which causes paroxysmal hypertension and is characterized histologically by cells clustering into nests (zellballen). False

82. Pheochromocytoma is one of the childhood tumors False → Neuroblastoma

83. Dispersed neuroendocrine cells and cells of the adrenal medulla, all of which have cytoplasmic membrane-bound granules, compose the paraganglion system True

84. Papillary carcinomas account for the majority of thyroid carcinomas, which are secondary to radiation True

85. Follicular carcinomas are derived from thyroid C cells and are associated with MEN syndromes True

86. In the best interests of the patient, the diagnosis of prostatic carcinoma always requires treatment False

87. Both epithelial and stromal cells participate in the development of benign prostatic hyperplasia True
A 45 year old woman presents with fatigue, weight loss and vague abdominal discomfort. She appears tanned but denies recent sun exposure. A thorough work-up for gastrointestinal disease is normal. Thyroid levels are normal and a general chemistry panel shows no abnormalities except for a slightly low serum sodium.

88. The best first test to assess for adrenal insufficiency would be:
A. 24 hour urine free cortisol
B. Random plasma cortisol
C. Cortrosyn stimulation test
D. Metyrapone test
E. None of these are useful

89. In this clinical setting, the presence of increased skin pigmentation suggests
A. a pituitary disorder (secondary adrenal insufficiency)
B. a primary adrenal disorder
C. exposure to exogenous glucocorticoids
D. exposure to exogenous mineralocorticoids
E. exposure to endogenous androgens

90. Treatment for this woman's condition will likely include:
a. Fludrocortisone
b. Ketoconazole
c. Insulin
d. Metformin
e. Mitotane

91. Match the condition with the lettered features:

Hypo Adrenal

92. Primary autoimmune adrenalitis
93. Metastases to adrenal glands
94. Tuberculous adrenalitis
95. Secondary adrenal insufficiency
96. Waterhouse-Friderichsen syndrome

A. Enlarged adrenal glands with loss of normal architecture
B. Effacement of adrenal architecture by a granulomatous-inflammatory reaction
C. Shrunken, hard to find, adrenal glands which microscopically show lymphoid infiltrate
D. Hemorrhagic adrenals associated with overwhelming infection
E. Lack of hyperpigmentation
After completing a rigorous defense of her doctoral thesis, Ms. Q is unable to relax. She experiences episodes of racing heart beat, waves of anxiety, a warm, sometimes hot sensation that has lead to disagreements with her room mate over thermostat settings. She experienced a steady decline in her ability to concentrate and noticed relentless weight loss despite an excellent appetite. She makes an appointment to see you when she is told that she is short tempered, impulsive and is not acting "normally".

96. The symptoms described above might be caused by any of the following defects EXCEPT:

A. A defect in the gene coding for the Thyroid Receptor Beta (TRβ) resulting in excessive sensitivity to the action of thyroxine.
B. An adenoma of the pituitary producing excessive amounts of Thyroid Stimulating Hormone (TSH) resulting in excessive production of thyroxine and triiodothyronine.
C. An autoimmune disease process resulting in the production of an antibody that specifically interacts with the TSH receptor resulting in excessive production of thyroxine and triiodothyronine.
D. A mutation in the TSH receptor gene resulting in a continuous "stimulated condition" leading to the production of cAMP and resulting in excessive production of thyroxine and triiodothyronine.
E. Ingestion of a homeopathic preparation containing thyroid hormone and other stimulants to delay sleep.

97. As her primary care physician you try to sort through the various reasons for her symptoms. Which of the following is most consistent with a diagnosis of Graves' disease?

<table>
<thead>
<tr>
<th>Thyroxine</th>
<th>triiodothyronine</th>
<th>TSH</th>
<th>Anti-TPO</th>
<th>Thyroglobulin</th>
<th>123-I uptake</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. elevated</td>
<td>elevated</td>
<td>low</td>
<td>elevated</td>
<td>low</td>
<td>low</td>
</tr>
<tr>
<td>B. elevated</td>
<td>low</td>
<td>low</td>
<td>negative</td>
<td>low</td>
<td>elevated</td>
</tr>
<tr>
<td>C. elevated</td>
<td>elevated</td>
<td>low</td>
<td>positive</td>
<td>elevated</td>
<td>elevated</td>
</tr>
<tr>
<td>D. low</td>
<td>elevated</td>
<td>high</td>
<td>negative</td>
<td>elevated</td>
<td>normal</td>
</tr>
<tr>
<td>E. low</td>
<td>low</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

98. In a pregnant woman with Graves Disease, which of the following would be the best therapeutic choice?

A. Iodine
B. Propranolol
C. Radioidine (1-131)
D. Prednisone
E. Propylthiouracil
A 45 year old woman is seen by her primary care physician for ongoing management of hypertension. She states that she has been feeling generally well. When asked about her body weight, she states that she always has been heavy. She does not weigh herself regularly, but thinks she probably is heavier now than she has been previously. In response to specific questions, she notes that he has arisen an average of once per night to urinate for several years, and that this has increased to two or sometimes three times per night for the past three months.

Review of her records from an ER visit for a urinary tract infection two months previously reveals a blood glucose level of 215 mg/dl.

The blood glucose level on this visit (2.5 hours after breakfast) is 225 mg/dl.

99. The most likely explanation for the blood glucose level in this patient is:

A. Type 1A diabetes
B. Type 1B diabetes
C. Type 2 diabetes
D. MODY with a glucokinase mutation
E. A thiazide diuretic side effect

100. Which of the following is not part of the generally recommended approach to the management of patients with this disease presentation:

A. A weight reduction diet
B. Consideration of oral agent or insulin
C. Self monitoring of blood glucose
D. The first dilated retinal exam at approximately 5 years after diagnosis
E. An electrocardiogram

101. Of the following treatments, the one least likely to cause hypoglycemia would be:

A. Regular insulin
B. Glyburide
C. Metformin
D. Repaglinide
E. Tolbutamide
It is not appropriate to obtain tissue samples from this patient. However, if tissue of her pancreas were examined microscopically, it would likely have this appearance:

![Image of tissue sample]

Type II
DM
Amyloid!

Answer true (A) or false (B) for each of the following: (1 point each)

102. The faint pink material seen throughout is amyloid  True

103. In this case, the precursor to the pink material is transthyretin False, Amylin True

104. In this case, the precursor to the pink material is amylin True

105. Deposition of the pink material is HLA-type-dependent False

106. The pink material is a pathological proteinaceous substance composing nonbranching fibrils arranged in cross β-pleated sheets False, True!
A 60-year-old male is admitted to the hospital because of progressive lethargy, anorexia, and vomiting. His serum calcium level is 15.0 mg/dl. Chest roentgenograms show a right hilar mass.

107. In addition to hydration with intravenous isotonic saline solution, which of the following would be most effective in lowering his serum calcium level?

A. Furosemide
B. Hydrochlorothiazide
C. Calcitonin
D. Prednisone
E. Pamidronate
A 18 year old adolescent presents with her mother who states that her daughter has never had a period.

108. Which of the following would be most important finding in your initial evaluation?

A. The mother has a strong family history of endometrial cancer
B. The daughter has normal breast and pubic hair development
C. The mother had a D&C (dilatation and curettage) following the birth of her daughter
D. Chromosomes on the MOTHER are 46, XX
E. Another daughter, who was adopted, has normal menstrual cycles

109. Which of the following information, tests or procedures would you want to know FIRST in the further evaluation of this patient (18 y. o. amenorrheic)?

A. DXA bone scan
B. MRI of the pituitary
C. TSH
D. 17 Hydroxy-progesterone
E. Family history
18-year-old boy presents to your office with Achilles tendonitis. On physical exam thickening of the Achilles tendon, and xanthelasma were noted. Family history remarkable for premature coronary artery disease.

110. The predominant lipoprotein abnormality in this patient involves
A. Chylomicrons
B. Very low density lipoprotein
C. Intermediate density lipoprotein
D. Low density lipoprotein
E. High-density lipoprotein

111. Plasma lipid profile that best describes this patient
A. High total cholesterol, high triglyceride
B. High total cholesterol, low triglyceride
C. High total cholesterol, normal triglyceride
D. Normal total cholesterol, low triglyceride
E. Normal total cholesterol, high triglyceride

112. The genetic disorder of lipoprotein metabolism is secondary to
A. Deficiency of Lipoprotein Lipase
B. Defects in the gene that encodes the LDL receptor
C. Defect in apo B-48 ligand
D. Deficiency of cholesteryl ester transfer protein
E. Defect in apo CII

113. HMG CoA Reductase Inhibitor will decrease the lipid abnormality seen in this disorder by
A. Decreasing the release of free fatty acids from adipose tissue
B. Decreasing LDL receptor expression
C. Decreasing cholesterol synthesis
D. Decreasing the production of VLDL from the liver
E. Enhancing lipoprotein lipase activity

114. Mechanism by which Lp (a) is a risk factor for CAD in this patient
A. Increase hepatic production of VLDL
B. Increases LDL receptor expression
C. Competes with plasminogen and impairs fibrinolysis
D. Decreasing lipoprotein lipase activity
E. Activates lipoprotein lipase activity
A 48-year-old man notices a painless swelling in his neck while shaving. He reports increased stress at work due to his frequent loss of composure and tendency to be hypercritical of those working under him. He has waited three weeks to see you and appears anxious and distraught the morning of his evaluation. His palms are moist, a smooth 3-centimeter mass is readily palpable in what appears to be the right anterior neck. He seems very worried about the lump in his neck and restlessly awaits your opinion.

115. Which of the following might account for the findings on physical exam?

A. A lesion of thyroid tissue developing after a somatic mutation of the TRH receptor.
B. Enlargement of the right lobe of the thyroid due to unilateral hyperstimulation of the gland by the dextro-rotator form of TSH produced in a pituitary adenoma.
C. Unilateral thyroid involvement with painless (deQuervain's) thyroiditis following a streptococcal infection.
D. Focal enlargement of an area of thyroid tissue in a macrofollicular (colloid) adenoma.
E. A proliferation of spindle cell sarcoma cells due to a defect in the RET-proto-oncogene.

116. This man undergoes a work up which includes the measurement of a serum TSH. Which of the following statements concerning the meaning of a suppressed serum TSH in this circumstance are true?

A. A suppressed TSH in this circumstance indicates the presence of autonomous thyroid hormone production.
B. A suppressed TSH indicates a mutation in the TSH receptor resulting in loss of function and diminished cAMP production.
C. The suppressed TSH is likely an artifact of the assay method as thyroid nodules are usually associated with Hashimoto's thyroiditis and hypothyroidism.
D. A suppressed TSH is only seen in patients with secondary or tertiary hypothyroidism and not in patients with nodular thyroid disease.
E. The suppressed TSH likely results from a mutation in the TRH receptor in the thyrotroph resulting in a dominant negative effect and diminished encoding of the TSH α gene.

117. You are advising a patient with hyperthyroidism to start treatment with methimazole or propylthiouracil. Which of the following is not considered to be a potential side-effect of these drugs?

A. Jaundice
B. Agranulocytosis
C. Myocardial infarction
D. Lupus-like syndrome
E. Skin rash
A 54 year old man is admitted to the hospital for elective repair of an inguinal hernia. His medical history is unremarkable except for long-standing obesity, with a current body mass index of 34 kg/m². His maximum waist circumference is 44 inches. As part of routine blood testing on the morning of his procedure, his fasting blood glucose level is noted to be 110 mg/dl. One month later, although asymptomatic, he is evaluated with a glucose tolerance test (75 gm oral glucose after overnight fasting). The blood glucose values are as follows:

<table>
<thead>
<tr>
<th>Time</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting</td>
<td>120 mg/dl</td>
</tr>
<tr>
<td>30 minute</td>
<td>140 mg/dl</td>
</tr>
<tr>
<td>1 hour</td>
<td>180 mg/dl</td>
</tr>
<tr>
<td>2 hour</td>
<td>165 mg/dl</td>
</tr>
<tr>
<td>hour</td>
<td>120 mg/dl</td>
</tr>
</tbody>
</table>

118. The most likely diagnosis in this patient is:

A. Normal glucose tolerance  
B. Type 1 diabetes  
C. Type 2 diabetes  
D. Impaired fasting glucose  
E. MODY diabetes

119. It is considered important to screen this patient for other features that may be used to diagnose the Metabolic Syndrome. Determinations that will enable you to establish this diagnosis are:

A. Blood pressure  
B. Fasting triglycerides  
C. HDL cholesterol  
D. A and C above, but not C  
E. A, B, and C above

120. The patient’s risk of developing Type 2 diabetes may be reduced with:

A. Intensive nutrition and exercise  
B. Metformin  
C. Either A or B  
D. The patient will inevitably develop diabetes regardless of any intervention  
E. A high carbohydrate, high calorie diet with low fat content
During a routine physical examination, a 65-year old male is noted to have a serum alkaline phosphatase level, which is twice normal. He is asymptomatic. His liver function tests and serum calcium and phosphate levels are normal.

121. The most likely diagnosis is:

A. Primary hyperparathyroidism  
B. Paget’s disease of bone  
C. Osteomalacia  
D. Bone metastases  
E. Secondary hyperparathyroidism

122. On bone scan, there is increased uptake in skull and proximal left femur. X-rays reveal osteoporosis circumscripta of the skull and sclerosis and lytic lesions of the proximal femur. An appropriate recommendation for this patient would be:

A. No therapy indicated at this time  
B. Nasal calcitonin  
C. Etidronate  
D. Risedronate  
E. Oral pamidronate

123. A 54-year old black male complains of back pain and fatigue. He is found to have pale conjunctivae, a resting pulse of 110 and tenderness of the lumbar spine. Laboratory data revealed a hematocrit of 27, serum calcium of 12.0 mg/dl, a normal serum alkaline phosphatase, and serum protein electrophoresis shows a monoclonal gamma globulin spike. Skeletal X-rays reveal severe demineralization. The most likely diagnosis is:

A. Primary hyperparathyroidism  
B. Sarcoidosis  
C. Severe osteoporosis  
D. Multiple myeloma  
E. Paget’s disease
A 20 year old woman presents with primary amenorrhea. An evaluation reveals the following chromosomes (45 X, O):

124. Which of the following would you **LEAST** expect to see on exam and evaluation?
A. Short stature  
B. Webbed neck  
C. Tanner stage IV pubic hair development  
D. Uterus present on ultrasound  
E. Signs of a hypoestrogenic state

125. Which of the following would be **LEAST** appropriate in the further evaluation, counseling, and management of this patient?
A. Use of donor eggs if pregnancy desired  
B. Use of estrogen replacement therapy  
C. DXA bone density determination  
D. MRI of pituitary  
E. Genetic counseling
35-year-old male is referred to your office for poorly controlled type 1 diabetes. He reports a recent Hgb A1C of 9.5 and an abnormal fasting lipid panel.

126. The lipoprotein abnormality in this patient could potentially involve all of the following except
   F. Chylomicrons
   G. Very low density lipoprotein
   H. Intermediate density lipoprotein
   I. Low density lipoprotein
   F. Lipoprotein (B)

127. The disorder of lipoprotein metabolism is secondary to:
   A. Decreased lipoprotein lipase activity and decreased LDL receptor activity
   B. Enhanced LDL receptor activity
   C. Defect in apo B-48 ligand
   D. Deficiency of cholesteryl ester transfer protein
   E. Defect in the Insulin receptor

128. Glycosylation of lipoproteins will
   A. Enhance the formation of foam cells and atheroma
   B. Enhance uptake by LDL receptors
   C. Enhance hydrolysis by lipoprotein lipase
   D. Interfere with the measurement of HgBA1C
   E. None of the above

129. Glycemic control with Insulin in this patient will
   A. Precipitate eruptive xanthomas
   B. Enhance foam cell formation
   C. Have no impact on lipid abnormality
   D. Improve lipid abnormality
   E. Worsen lipid abnormality
A 34-y/o male presents for the evaluation of infertility. He and his 30-y/o wife have been having unprotected intercourse for 3 years without a conception. He is a statewide body building champion and uses anabolic steroids. His evaluation is significant for small testes. His semen demonstrates no sperm (azoospermia).

130. You would expect which of the following?
A. Low testosterone with a elevated LH
B. High FSH and LH
C. Low FSH and LH
D. Greater than normal sperm production
E. Normal FSH, LH, and testosterone

131. On further questioning you determine that the patient’s last testosterone shot that morning was twice the normal dose. His physical exam demonstrates normal facial hair and normal androgenization. You would expect which of the following?
A. Normal spermatogenesis
B. High intra-testicular testosterone levels
C. Low intra-testicular testosterone levels
D. Low peripheral (venous blood) testosterone levels
E. Obstruction of the vas deferens

132. After an extensive evaluation, you decide to treat the patient. The following is a reasonable treatment.
A. Continued testosterone injections but at a normal dose
B. Discontinue anabolic steroids
C. Oral GnRH pills
D. Aromatase inhibitor
E. Inhibin