

# Exercise 4: endocrine system physiology assignment

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### Hormones and Metabolism Activity 1: Determining the Baseline Metabolic

Rates 1. Which rat had the fastest baseline metabolic rate? Normal rate 2.

Why did the metabolic rates differ? Because of the different organs that were removed from the two other rats that would produce certain hormones 3. If an animal has been thyroidectomized, what hormone(s) would be missing from its blood? thyroxine 4. As a result of the missing hormone(s), what would the overall effect on the body and metabolism be? Thyroxine wouldn't be released which helps maintain metabolism and body.

So 5. How could you treat a thyroidectomized animal so that it functioned like a "normal" animal? I would assume giving it shots of thyroxine or t4, of course by measuring weight and figuring out exactly the right amount to keep it established. 6. If an animal has been hypophysectomized, what effect would you expect to see in the hormone levels in its body? The hormone levels would also be lowered 7. What would be the effect of a hypophysectomy on the metabolism of an animal? Metabolism would drop

### Activity 2: Determining the Effect of Thyroxine on Metabolic Rate 1.

What was the effect of thyroxine on the normal rat's metabolic rate? How does it compare to the normal rat's baseline metabolic rate? The metabolic rate went up, and was higher than the normal baseline 2. Why was this effect seen? Because it already has thyroxin and when you add more of it then it goes even quicker. 3. What was the effect of thyroxine on the thyroidectomized rat's metabolic rate? How does it compare to the thyroidectomized rat's baseline metabolic rate? It raised the rate, even though it wasn't as high as the baseline one, it still help to try and balance it out 4.

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Why was this effect seen? Metabolic rate was raised to try and reach normal rates even though still lower than the baseline. It has its pituitary gland so some hormones are there. 5. What was the effect of thyroxine on the hypophysectomized rat's metabolic rate? How does it compare to the hypophysectomized rat's baseline metabolic rate? Raised the metabolic rate but not as high as the thyroidectomized or normal rats. 6. Why was this effect seen? This rat has its thyroid but no pituitary gland so it's the lowest on metabolic rate. Activity 3: Determining the Effect of TSH on Metabolic Rate . What was the effect of TSH on the normal rat's metabolic rate? How does it compare to the normal rat's baseline metabolic rate? The metabolic rate went way up there, the rate of the baseline was a lot lower. 2. Why was this effect seen? Because TSH cause the thyroid to produce more thyroxine 3. What was the effect of TSH on the thyroidectomized rat's metabolic rate? How does it compare to the thyroidectomized rat's baseline metabolic rate? Metabolic rate didn't really go up, it was little above the baseline. TSH, wouldn't be very effective without a thyroid to stimulate 4.

Why was this effect seen? No thyroid to stimulate 5. What was the effect of TSH on the hypophysectomized rat's metabolic rate? How does it compare to the hypophysectomized rat's baseline metabolic rate? The metabolic rate went up, was higher than thyroidectomized rat, but little lower than the normal rat. Its trying to level out to what would be normal. 6. Why was this effect seen? Metabolism is the same because its not exactly right but at least the right hormones to try and level it out. Activity 4: Determining the Effect of Propylthiouracil on Metabolic Rate . What was the effect of propylthiouracil on the normal rat's metabolic rate? How does it compare to the normal rat's

baseline metabolic rate? It slowed down the metabolic rate compared to the normal baseline 2. Why was this effect seen? Propylthiouracil inhibits the production of thyroxine 3. What was the effect of propylthiouracil on the thyroidectomized rat's metabolic rate? How does it compare to the thyroidectomized rat's baseline metabolic rate? It slowed it down but not as much as the normal rat 4. Why was this effect seen?

Thyroidectomized rat is not effected as much because it is missing thyroid 5. What was the effect of propylthiouracil on the hypophysectomized rat's metabolic rate? How does it compare to the hypophysectomized rat's baseline metabolic rate? Didn't see to much of an effect overall. 6. Why was this effect seen? It didn't have anything to effect since it had the important parts that would be affected removed. Hormone Replacement Therapy Activity 5: Hormone Replacement Therapy 1. T score (control): -2. 61 2. T score (estrogen): -2 3. T score (calcitonin): -2. 5 4.

What effect did the administration of estrogen injections have on the estrogen-treated rat? The estrogen treated rat was able to get into the ranges of just bone thinning which suggests the estrogen injections were helping. 5. What effect did the administration of calcitonin injections have on the calcitonin-treated rat? The injection helped a little but still has osteoporosis while estrogen shots seem to help out better in the long run.

Insulin and Diabetes Activity 7: Measuring Fasting Plasma Glucose 1. Sample 1: glucose concentration of 104 mg/deciliter. 2.

Sample 2: glucose concentration of 118 mg/deciliter. 3. Sample 3: glucose concentration of 133 mg/deciliter. 4. Sample 4: glucose concentration of 123

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mg/deciliter. 5. Sample 5: glucose concentration of 143 mg/deciliter. 6. For which patient(s) were the fasting plasma glucose reading(s) in the normal range? Sample 1 7. For which patient(s) were the fasting plasma glucose reading(s) in the diabetic range? Samples 3 & 5 8. For which patient(s) were the fasting plasma glucose reading(s) in the impaired range? Samples 2 & 4 9.

What recommendations would you make to a patient with an impaired FPG value who also tested in the impaired range with the oral glucose tolerance test? They are at a higher risk of developing type 2 diabetes and I would suggest keeping an eye on this, even following a diet to try to keep it in check. 10. Patient 3 is pregnant; how might this change the diagnosis? They may have gestational diabetes. 11. What recommendations would you make to this patient? To keep on a strict diet until they have their baby. Activity 8: Measuring Cortisol and Adrenocorticotrophic Hormone 1. Patient 1: Cortisol: 2. 0 mcg/dL 2. High or Low? Low 3. Patient 1: ACTH: 18. 10 pg/ml 4. High or Low? low 5. Patient 2: Cortisol: 36. 35 mcg/dL 6. High or Low? high 7. Patient : ACTH: 12. 16 pg/ml 8. High or Low? low 9. Patient 3: Cortisol: 43. 28 mcg/dL 10. High or Low? high 11. Patient 3: ACTH: 83. 28 pg/ml 12. High or Low? high 13. Patient 4: Cortisol: 2. 68 mcg/dL 14. High or Low? low 15. Patient 4: ACTH: 101. 67 pg/ml 16. High or Low? high 17. Patient 5: Cortisol: 49. 94 mcg/dL 18. High or Low? high 19. Patient 5: ACTH: 18. 48 pg/ml 20. High or Low? low