

Name: _____

Period: _____

Fertility Case Study Packet

You are a doctor working in a fertility clinic. A married couple, Jailyn and Carlos Jenkins, visit you because they have been trying to get pregnant for about two years but have had no success. It is your responsibility to diagnose the cause of their infertility.

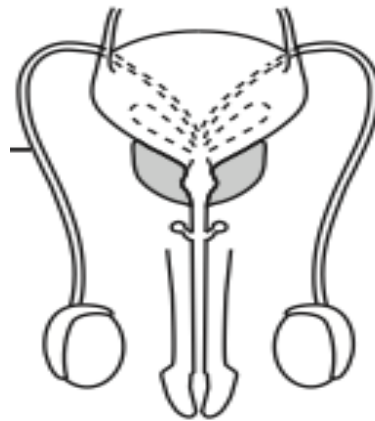
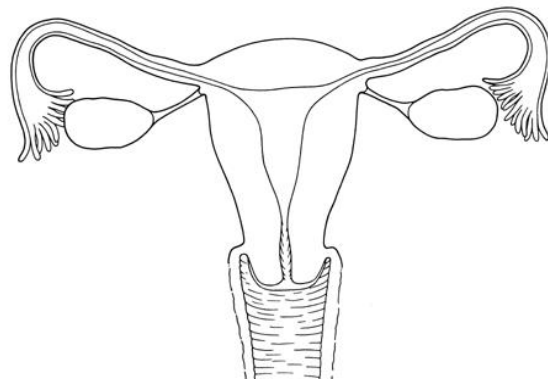
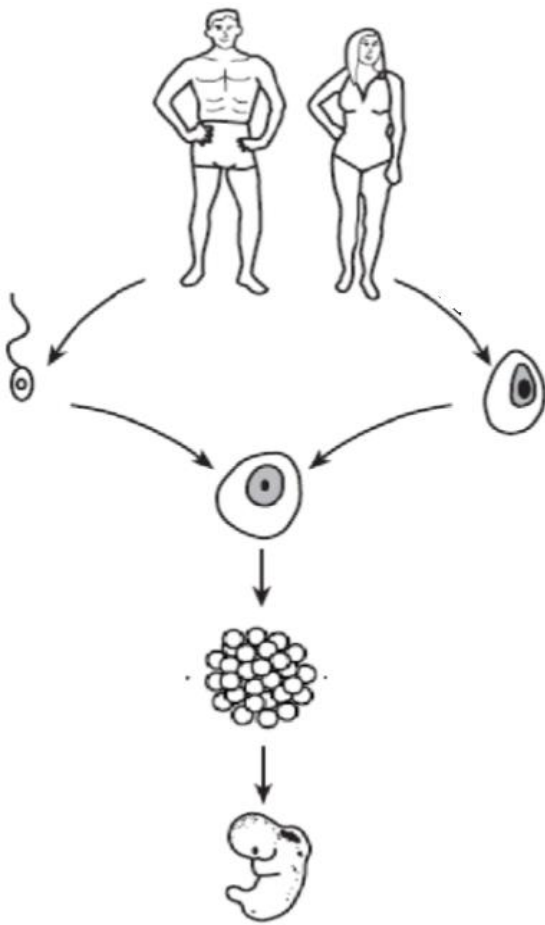
First label the following on the drawings below: a) testes, b) ovaries, c) fallopian tubes, d) uterus, e) male gamete or sex cell (sperm), f) female gamete or sex cell (egg), g) zygote, and h) embryo.

Next, think about some potential causes of infertility?

Use the figures below to identify **four** things that must happen for a successful pregnancy to occur:

1) _____ 2) _____

3) _____ 4) _____



When page 1 is completed, ask your teacher for **Clue #1**.

Using the information about Carlos and Jailyn’s medical history, answer the following questions:

1. Is there any indication that the cause of infertility is due to environmental factors in Carlos or Jailyn’s life?

If yes, explain what environmental factor might be affecting their fertility.

If no, explain why you do not believe environmental factors may be affecting their fertility **or** what other information you would need to determine if environmental factors are affecting their fertility.

2. Is there any indication that the cause of infertility is due to genetic factors?

If yes, explain what genetic factor might be affecting their fertility.

If no, explain why you do not believe genetic factors may be affecting their fertility **or** what other information you would need to determine if genetic factors are affecting their fertility.

3. Is there any indication that the cause of infertility is due to their medical histories?

If yes, explain what about their medical history might be affecting their fertility.

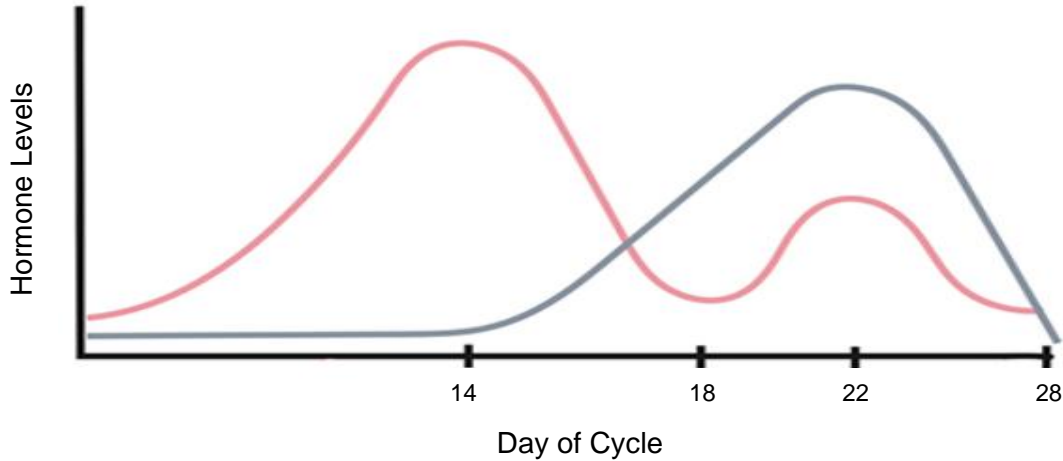
If no, explain why you do not believe their medical histories are affecting their fertility **or** what other information you would need to determine if their medical histories are affecting their fertility.

After reviewing your patients’ medical history, you decide that you need some additional information about Jailyn’s hormone levels. You order a blood test to assess whether or not her hormone levels are normal.

4. State the two main female reproductive hormones.

_____ and _____

5. Using your textbook and/or online resources, label each line in the graph below with the correct hormones you identified above:



6. List two principal roles of the female reproductive hormones?

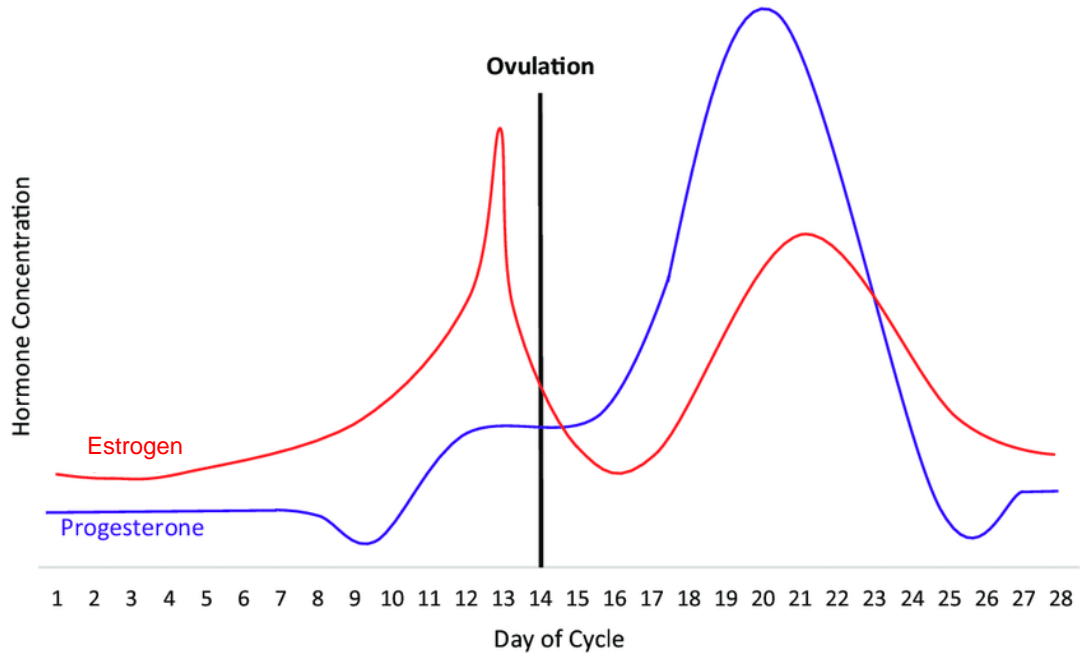
- 1) _____
- 2) _____

7. Name the organ in the female reproductive system that produces hormones.

8. Describe one possible way that hormone levels could be the cause of infertility.

After completing this page, ask your teacher for **Clue #2**, your patient's hormone test results!

Use the graph of a typical menstrual cycle to help you answer questions 9-13 below:



9. What is ovulation? _____

10. What causes ovulation? (Hint: What are the hormones levels just before ovulation?)

11. On what day does ovulation occur? _____

12. Does Jailyn have the normal hormone levels to cause her to ovulate?

13. Do you think that Jailyn's hormone levels are the cause of infertility? Why? Why not?

After looking into Jailyn's hormone levels, you decide to check if her anatomy (body parts) are normal. You order a pelvic ultrasound. Obtain **Clue #3** from your teacher and move on to the next page.

Using the results from Jaily'n's ultrasound in **Clue #3**, answer questions 14-17.

14. Do you have any concerns about the structure of Jaily'n's uterus? Why? Why not?

15. Do you have any concerns about the appearance of Jaily'n's fallopian tubes? Why? Why not?

16. Do you have any concerns about the positions of Jaily'n's ovaries? Why? Why not?

17. Based on Jaily'n's ultrasound, is there anything about her reproductive anatomy that may be causing her infertility? Explain why you believe her anatomy may or may not be contributing to her infertility.

While you were explaining Jaily'n's hormone lab results to the couple, Carlos mentions that 10 years ago he was a bodybuilder. Carlos tells you he knows all about the male reproductive hormone, testosterone, because that is the main ingredient in steroids. He confesses to using steroids briefly when he participated in bodybuilding competitions 10 years ago. Do you think Carlos prior incidents of taking steroids could affect his fertility?

Reflect on Carlos's situation and record your answer below.

Then get **Clue #4** from your teacher.

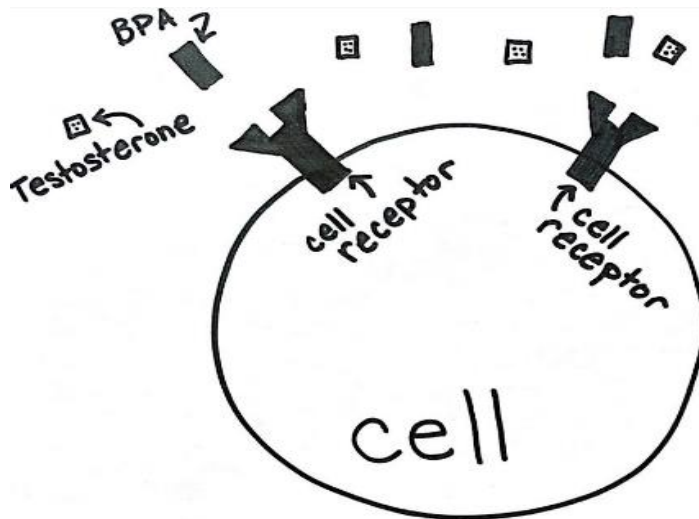
18. Where is testosterone normally produced in the male? _____

19. Testosterone is required for the production of what key part of the male reproductive system? _____

20. You decide to test Carlos's hormone levels to determine if his anabolic steroid use from 10 years ago is still affecting his testosterone levels today. Given what you know about anabolic steroids, would you expect Carlos to have higher-than-normal or lower-than-normal testosterone production? Why? Or why not?

After completing the questions 18-20, see your teacher to obtain **Clue #5** showing information on the effect of steroids.

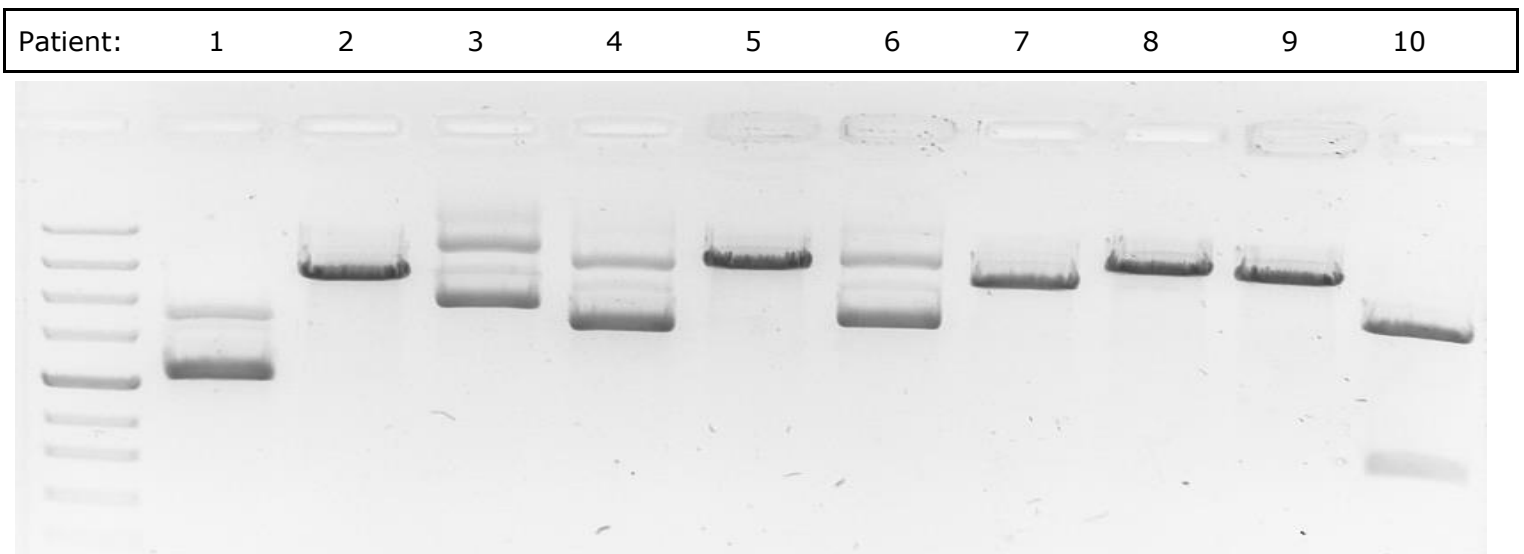
21. Using the information from Clue #5, draw on the diagram to show why Carlos's hormone levels are not normal. Explain your answer below.



Before deciding on a treatment plan for Carlos and Jaily, you decide to run one more test. You want to know if there are any genetic factors that may be affecting Jaily's fertility. You obtain a sample of Jaily's DNA and use gel electrophoresis to evaluate a specific gene involved in infertility.

22. Describe how gel electrophoresis work. Your answer should include the terms "DNA fragments", "size", and "speed".

Below are the gel electrophoresis results from Jaily compared to nine other patients.



Gel Electrophoresis Analysis

- Patient 1, 3, and 10 were originally unable to get pregnant because of problems with their partner's sperm.
- Patients 2 and 8 had a hormonal imbalance and needed to take hormone supplements in order to get pregnant.
- Patients 7 and 9 had abnormal menstrual cycles and had to take hormonal supplements in order to get pregnant.
- Patient 6 was diagnosed with a condition called Premature Ovarian Failure. Patient 6 was able to get pregnant using in-vitro fertilization (IVF).
- Jaily is Patient 4

23. Which patient would you expect to have a similar diagnosis to Patient 4? Why?

Use the gel electrophoresis results and **Clue #6** to answer the following questions:

24. What gene(s) may be altered in Patient 4 and Patient 6? _____

25. Do you think that any of the other patients besides Patient 4 and Patient 6 have an altered version of this gene? Why or why not?

26. Based on Jaily's gel electrophoresis results, do you think there is a genetic component to her infertility? If yes, what is it? If no, why not?

Now consider all of the information you've learned about Carlos and Jaily from this case study and make an official diagnosis. You must state whether you think their infertility is primarily due to:

- Carlos's testosterone levels,
- Jaily's endometriosis, or
- Jaily's genetic condition.

Once you've made your decision, fill out the official Doctor's Notes and Diagnosis form on the next page.

RGH Laboratory
Reproductive Specialists
2020 Rochester Road
East Irondequoit, NY 14618



Doctor's Notes and Diagnosis

Patient name(s): _____

Primary cause of infertility: _____

Treatment Plan

List three things that Jailyn and Carlos can do to improve their chances of getting pregnant:

1) _____

2) _____

3) _____

Doctor's signature
