



CASE TEACHING NOTES

for

"Abracadabra: Magic Johnson and Anti- HIV Treatments"

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INTRODUCTION / BACKGROUND

This case introduces students to HIV, its life cycle, treatments for HIV infection, and problems associated with treatment options. Each part of the case builds on ideas from the previous part. The core of the case is having students learn about the HIV life cycle since this serves as the basis for understanding drug treatment targets and obstacles in using anti-HIV drugs. Since Magic Johnson is a well-known sports figure, this allows students to identify with a person who is HIV-positive. Many other HIV-related activities could be assigned for the students before or after the case is implemented. The case incorporates critical thinking skills, active learning, self-directed study, and peer-to-peer learning.

This case was developed for use in an undergraduate upper-level biology course entitled "Molecular Basis of Disease." The case would also be appropriate for an immunology class, a molecular evolution class, and a general biology class to introduce viruses, although Part III is more advanced for a general biology course. The case would be implemented after a discussion of the immune system as an introduction to immunodeficiency or used as an in-depth example to study microevolution.

Objectives:

- Describe the symptoms related to HIV/AIDS and how a person is tested for HIV.
- Propose treatment targets for controlling HIV infection based on its life cycle.
- Speculate biological and immunological reasons for why HIV infected people are non-progressors and progressors.
- Describe molecular mechanisms of HIV drug resistance and molecular evolution.
- Determine the pros and cons for specific HIV treatment approaches.

CLASSROOM MANAGEMENT

Variation I

This activity was originally designed for a 75-minute class session:

(1) Part I of the case is given as a take-home assignment so students can investigate background information about HIV and answer the questions prior to the class discussion using the suggested general HIV/AIDS websites (listed below) as a resource.

(2) Parts II and III are handed out and discussed in class. The instructor reads each part aloud and then allows time for students to complete the questions in pairs or small groups. The class then reconvenes and discusses the questions. Many of the questions require students to illustrate and explain events that occur with HIV infection from a biological and immunological perspective using graphs. Students explain each of their answers and the reasoning to support their answers in front of the class.

Variation II

Students are assigned a character from the case such as Magic Johnson, Dr. Michael Mellman, another HIV-positive patient, and a GlaxoSmithKline sales person. Students who take on the roles of Magic Johnson and Dr. Mellman are given Part II of the case and assigned to explain to the HIV-positive patient group of students how HIV and anti-HIV drugs function and answer specific questions from each part of the case. Part III is given to the group of students representing an HIV research company to explain how drug resistance mechanisms work.

Possible Follow-up Assignments

1. Have students explore the Los Alamos HIV mutation database. List and describe specific mutations in other HIV proteins and how these mutations could lead to drug-resistance.
2. Have students design an ad campaign to explain how HIV infects a person, how the HIV life cycle proceeds, and how HAART drug treatments work.
3. Have students watch the movie "And the Band Played On" and write a movie review assessing how the HIV epidemic is portrayed from the perspective of a biomedical scientist.
4. Have students explain the laboratory techniques of ELISA and Western blot used in HIV testing. Ask the question why antibody testing is used instead of isolation of the virus. Answers include: cost, risk of virus exposure, and speed of results.

ANSWER KEY

Answers to the questions posed in the case study are provided in a separate answer key to the case. Those answers are password-protected. To access the answers for this case, go to [the key](#). You will be prompted for a username and password. For the username and password, contact the National Center for Case Study Teaching in Science administrator at answerkey@sciencecases.org.

REFERENCES

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http://www.hollywoodauditions.com/Biographies/magic_johnson.htm
- History Channel—Speeches
http://www.historychannel.com/speeches/archive/speech_490.html
[Magic Johnson's announcement that he is HIV-positive.]
- CDC National AIDS hotline: 1-800-342-AIDS
- GlaxoSmithKline
<http://www.gsk.com/index.htm>

- Conway, Brian, and David Katzenstein. 2001. Structured Treatment Interruption: Novel Strategy or Oxymoron? *HIV Resistance Web*
<http://www.hivresistanceweb.com/protected/po/01apr/bc-01apr25-po-sti.shtml>
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<http://hiv-web.lanl.gov/content/index>
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- Sexually Transmitted Diseases—amFar AIDS research
<http://www.amfar.org/cgi-bin/iowa/topic.html?record=30>
- Stine, Gerald. *AIDS Update 2003*. Upper Saddle River, NJ: Prentice Hall, 2003.

General HIV/AIDS

- Joint United Nations Programme on HIV/AIDS
<http://www.unaids.org/>
- Centers for Disease Control
<http://www.cdc.org>
- Healthcrite—AIDS and HIV Disease
<http://www.healthcrite.com/HealthReview/p1767.html>
- World Bank HIV/AIDS Page
http://www1.worldbank.org/hiv_aids/

HIV Life Cycle

- HIV Life Cycle in Flash animation—*Johns Hopkins AIDS Service*
http://www.hopkins-aids.edu/hiv_lifecycle/hivcycle_txt.html
- Life Cycle Of The Virus—*AIDS Education Global Information System (AEGiS)*
<http://www.aegis.com/topics/virus/>
- HIV Life Cycle—*AIDS.org*
<http://www.aids.org/FactSheets/415-life-cycle.html>

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