

# Immunodeficiency Disease

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## Booklet C

### Pretest Correct Answers

Please discuss the answers to each question with the members of your group. Be sure that no one has any questions about them. If any one does, try to explain the rationale for the right answer. In explaining something to another person, most people gain a better understanding of it and often transmit a better understanding. *The pretest discussion and patient-oriented problem-solving parts of this activity are "open book."* Be sure to refer to textbooks, notes, and other written resources whenever questions arise.

5. Some chemicals, such as dinitrochlorobenzene, and some natural products, such as a catechol found in the sap of the poison ivy plant, can produce a skin condition called allergic contact dermatitis. This is a cell-mediated immune response believed to be produced in response to alterations in the skin proteins by the chemicals. B is therefore correct. A is incorrect since no antibody is involved. (Ask your colleagues what class of antibody is involved in immediate-type allergic reactions. Answer: IgE.) C is incorrect since the poison ivy reaction does not occur on the first exposure, whereas a reaction occurs the first time one is exposed to a caustic irritant. D is incorrect since IgE plays no role in allergic contact dermatitis in humans.
9. The complement (C) fixation test on serum X shows results from an assay in which the antiserum contains Ab to the homologous Ag. These react and fix C; hence, there is no C left to lyse the RBCs in tube 1. Tubes 2 and 3 show that neither Ag nor serum X interferes with complement-mediated lysis of indicator RBCs. Tube 4 shows there is no nonspecific or spontaneous lysis of RBCs. Tubes 2, 3, and 4 are controls. Therefore, the answer is A.
11. For bronchial secretions Z, it can be concluded that no *C-fixing antibody* was formed, since complement is not fixed (tube 9) and controls are satisfactory (tubes 10 through 12). In the complement fixation assay, C2 is the limiting factor; thus, the assay is very insensitive to C fixation by the alternate pathway. Hence, this assay does not rule out the possibility that antibody (eg, IgA or a subclass of IgG, IgG4), which only fixes C by the alternate and not by the classic pathway, was formed. Therefore, the correct answer is E.

**After discussing all the pretest answers, please instruct your group to proceed to the "Introduction to the Clinical Problem."**

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## Introduction to the Clinical Problem

The goal of this exercise is twofold. One is to help you learn how to apply your basic knowledge of immunology to clinical problems. The other is to help you learn how to work with other people (ie, how to learn from them and solve problems together). Good health professionals must first be able to learn from their patients and then be able to teach them. With this in mind, the data necessary for the solution of the patient-oriented immunological problem have been divided into four parts so that everyone in your group must share data to arrive at a diagnosis.

Please do your best to teach each other; seek additional information from your textbooks and share it with each other and, as a group, arrive at the correct diagnosis in a logical way. At the end of the exercise, everyone in the group should agree on the diagnosis and be able to identify the data that were (1) consistent with the diagnosis, (2) irrelevant to making the correct diagnosis, or (3) inconsistent with the diagnosis. You also should understand the principles behind each observation and laboratory assay. At the end of this problem, you will look at the correct answers to the problem and compare them with the answers you and your group wrote.

**Begin the problem by presenting the patient's history on the following page to your colleagues.**

# Immunodeficiency Disease

## Data Sheet C

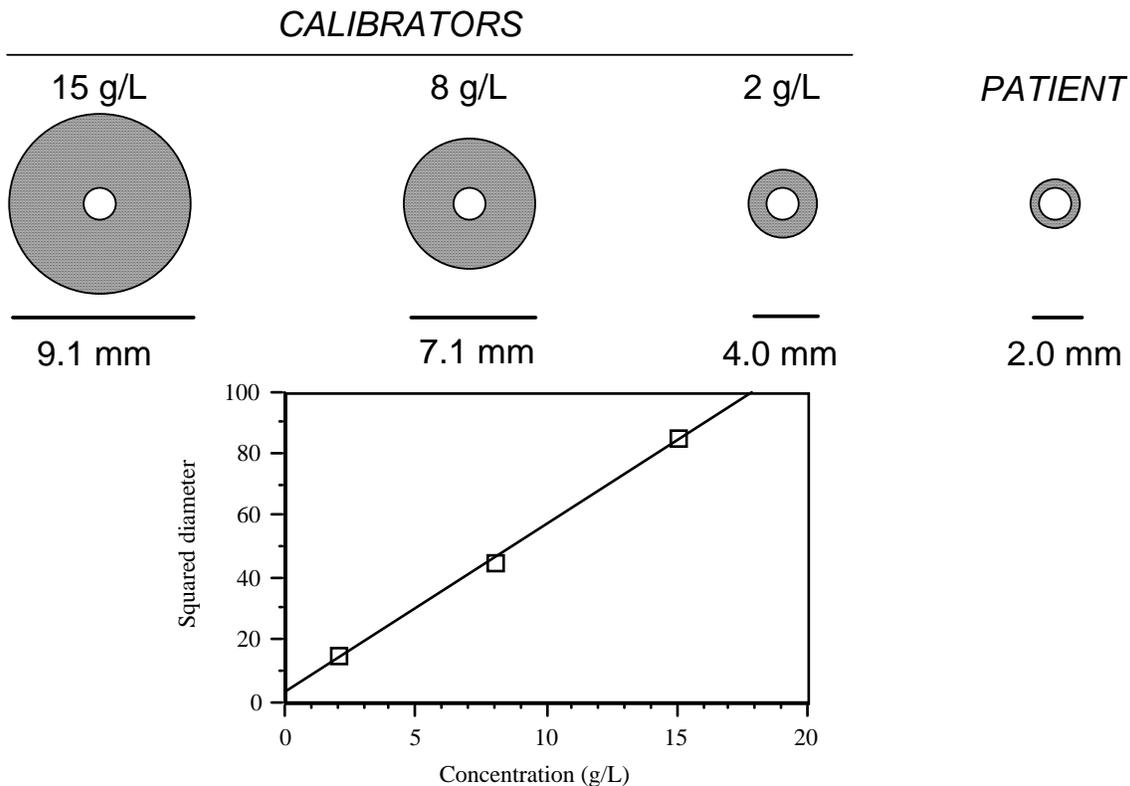
### Laboratory Data

#### Microbiology Lab Report

Pneumococcus (type 3) was isolated from needle lung aspirate. (A needle was inserted through the chest wall into the right posterior chest, and a few drops of fluid were aspirated.)

#### Serology and clinical chemistry report on serum drawn at time of admission to hospital.

##### 1. IgG assay by Radial Immunodiffusion (normal 5.2 to 12.1 g/L)



2. **Pneumococcal antibody panel**, including serotypes 1, 3, 4, 6A, 7F, 8, 9N, 12f, 14, 18C, 19F, 23F: *no antibody detected against any of the serotypes.*

3. **Tetanus and diphtheria antibody assays**: Antibodies to diphtheria and tetanus toxoid were assayed by an enzyme immunoassay using immobilized toxoids and conjugated anti-human immunoglobulin antibody. For both assays the levels of antibody were lower than 0.01 U/mL (protective level >0.16 U/mL).

4. **Complement hemolytic activity (CH50)**: The ability of this patient's serum to cause lysis of 50% of a standard dose of antibody-sensitized sheep red cells was compared with the same ability of a reference serum. The results are expressed in "hemolytic units".

*Patient: 165 units (Normal: >150 units)*

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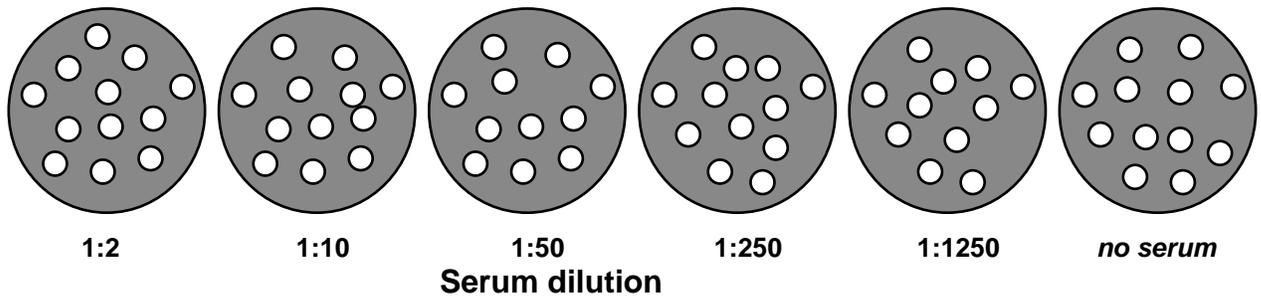
## Data Sheet C (ctd.)

### 5. Mumps complement fixation

Mumps antigen was added to diluted serum (serum was previously heated to destroy its complement [C]), then C was added and allowed to incubate. Finally, indicator RBCs (RBCs coated with antibody to the RBCs) were added.

Serum dilutions	1:4	1:8	1:16	1:32	1:64	1:128	1:256	1:512	Indicator RBCs + C'	Indicator RBCs + saline
Age-matched control serum:										
Patient's serum:										

### 6. Poliovirus 50% plaque reduction titer (Normal positive is greater than 1:10.)



### 7. Isohemagglutinins

- Saline + patient's RBCs:
- Anti-B + patient's RBCs:
- Anti-A + patient's RBCs:
- Patient's serum + known type B RBCs:
- Patient's serum + known type A RBCs:

The next step is to review the additional data given on *Data Sheet D*.