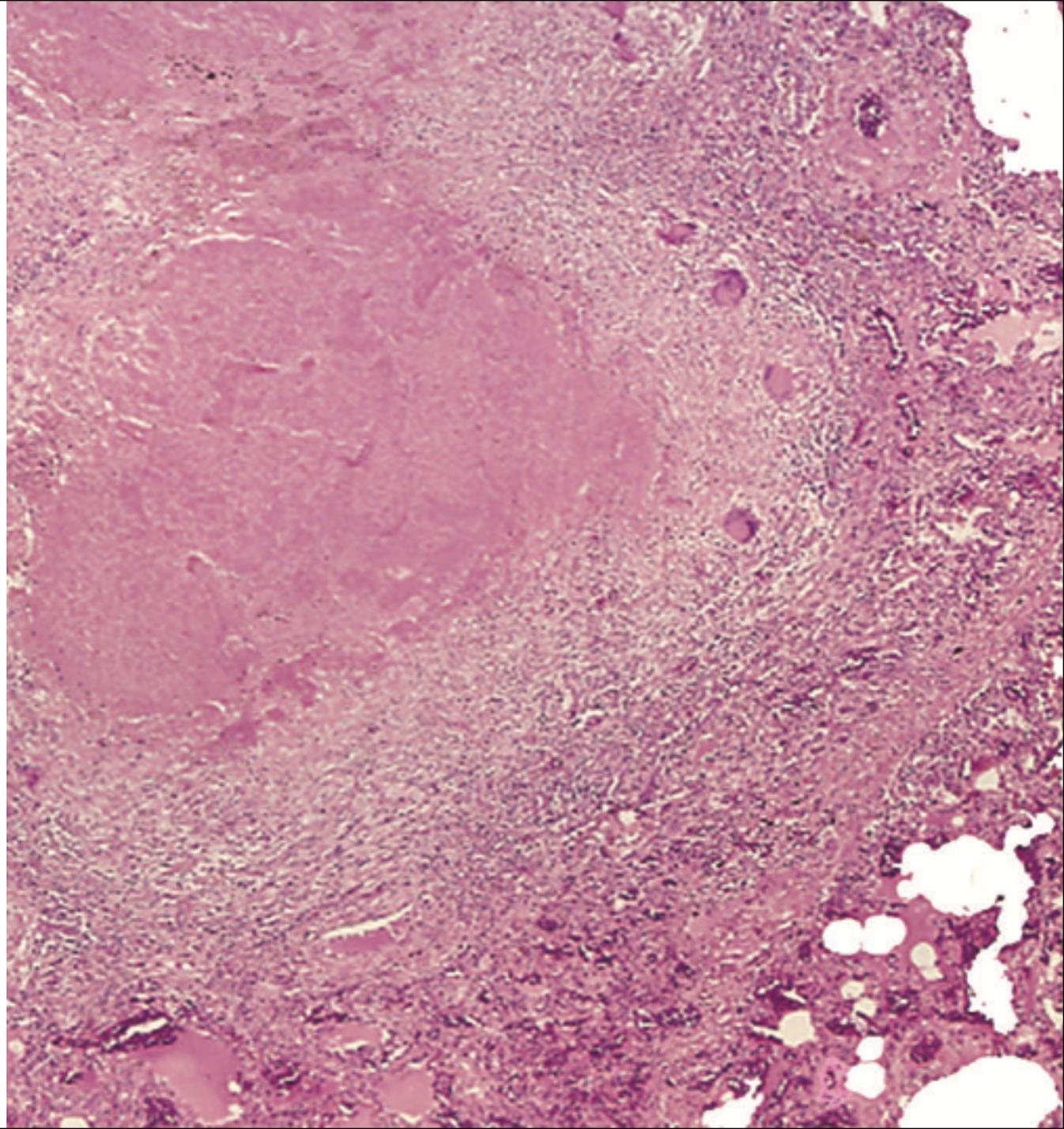


Lecture 9 cases

A 39-year-old gentleman had cough with a low-grade fever and a 4-kg weight loss over the course of 3 months. A lung biopsy is performed as in the figure. An acid-fast stain of this tissue is positive. The causative infectious agent is most likely being destroyed by which of the following mechanisms?

- A Complement-mediated lysis
- B Elaboration of nitric oxide by macrophages
- C Phagocytosis by eosinophils
- D Superoxide formation within phagolysosomes



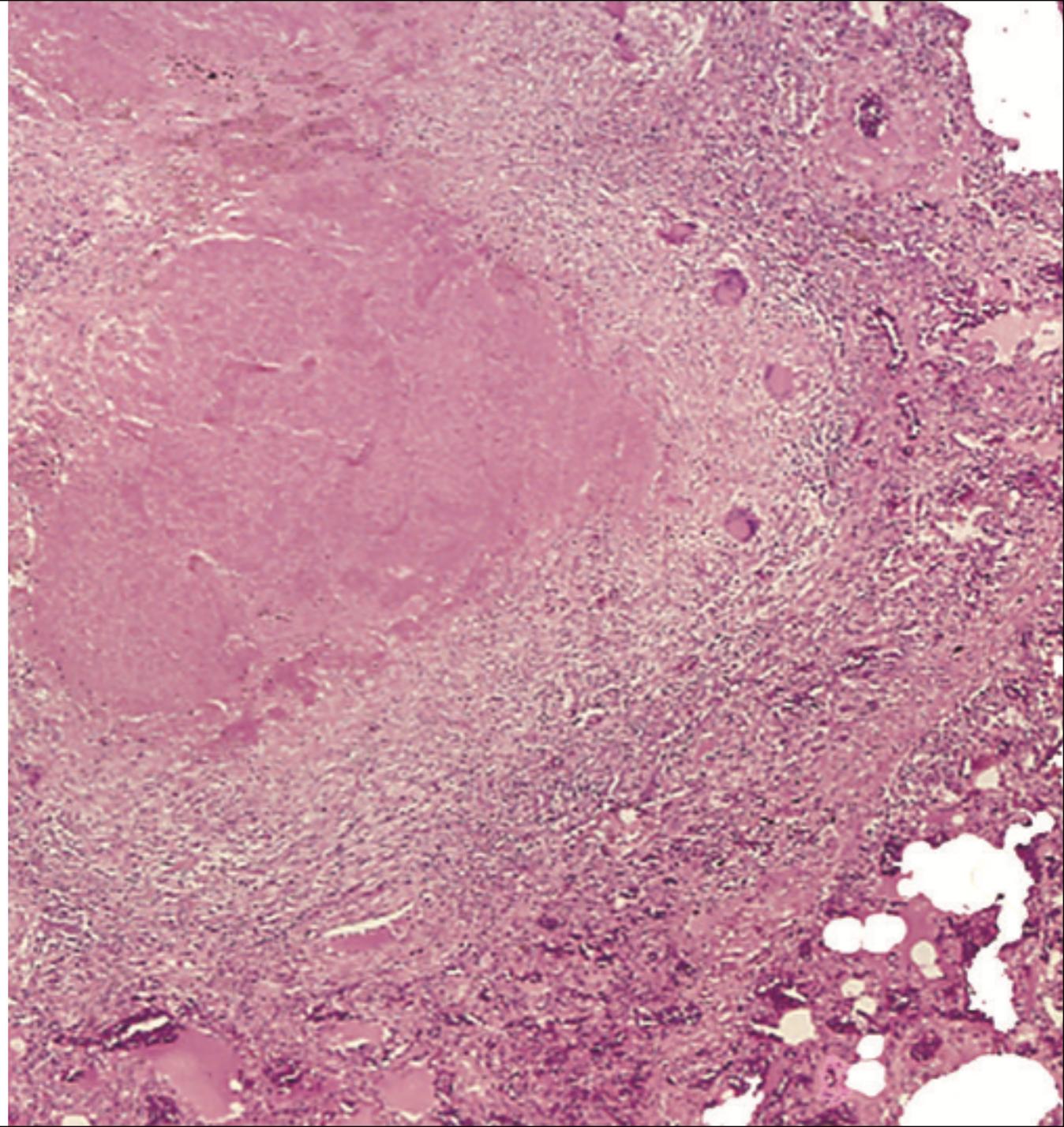
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Explanation:

- The figure shows a caseating granuloma.
- Activated macrophages are the key cellular component within granulomas that form to control persistent organisms such as *Mycobacterium tuberculosis*. As part of delayed type hypersensitivity with a TH1 immune response, CD4+ cells secrete interferon- γ , which activates macrophages to kill organisms with reactive nitrogen intermediates.
- Complement-mediated lysis is not involved in the destruction of intracellular bacteria such as *M. tuberculosis*.
- Eosinophils are not a major component of most granulomas, and they cannot destroy mycobacteria.
- *M. tuberculosis* organisms reside in phagosomes, which are not acidified into phagolysosomes.

A 4-year-old boy is exposed to *Mycobacterium tuberculosis*. A month later the child's tuberculin skin test is positive. The child then develops fever, and nonproductive cough. Which of the following findings is most likely to be present on the chest radiograph of this child?

- A Hilar lymphadenopathy
- B Miliary pulmonary nodules
- C Pneumonic consolidation
- D Upper lobe cavitation

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Explanation:

- The child has primary tuberculosis. Most healthy persons have subclinical disease, and a minority develop clinical manifestations; of those, most have limited pulmonary involvement without dissemination. Primary tuberculosis is marked by the Ghon complex, which is a small subpleural granuloma at mid-lung along with prominent enlarged hilar lymph nodes. These nodes may impinge upon central airways.
- When the cell-mediated immune response is poor, then there can be numerous small granulomas scattered throughout the lungs, or disseminated to other organs, as a miliary pattern (granulomas that are the size of millet seeds).
- Progressive primary tuberculosis can lead to more extensive lung involvement with pneumonic infiltrates.
- Upper lobe cavitory disease is characteristic for secondary tuberculosis (reactivation or reinfection) in persons who have previously mounted an immune response.