

به نام خدا



Bacteriology Lab 2

By: **Dr. A. Mohammadi**

Department of Biology,
Faculty of science,
University of Alzahra

میکروارگانیزم های دستگاه تنفس تحتانی

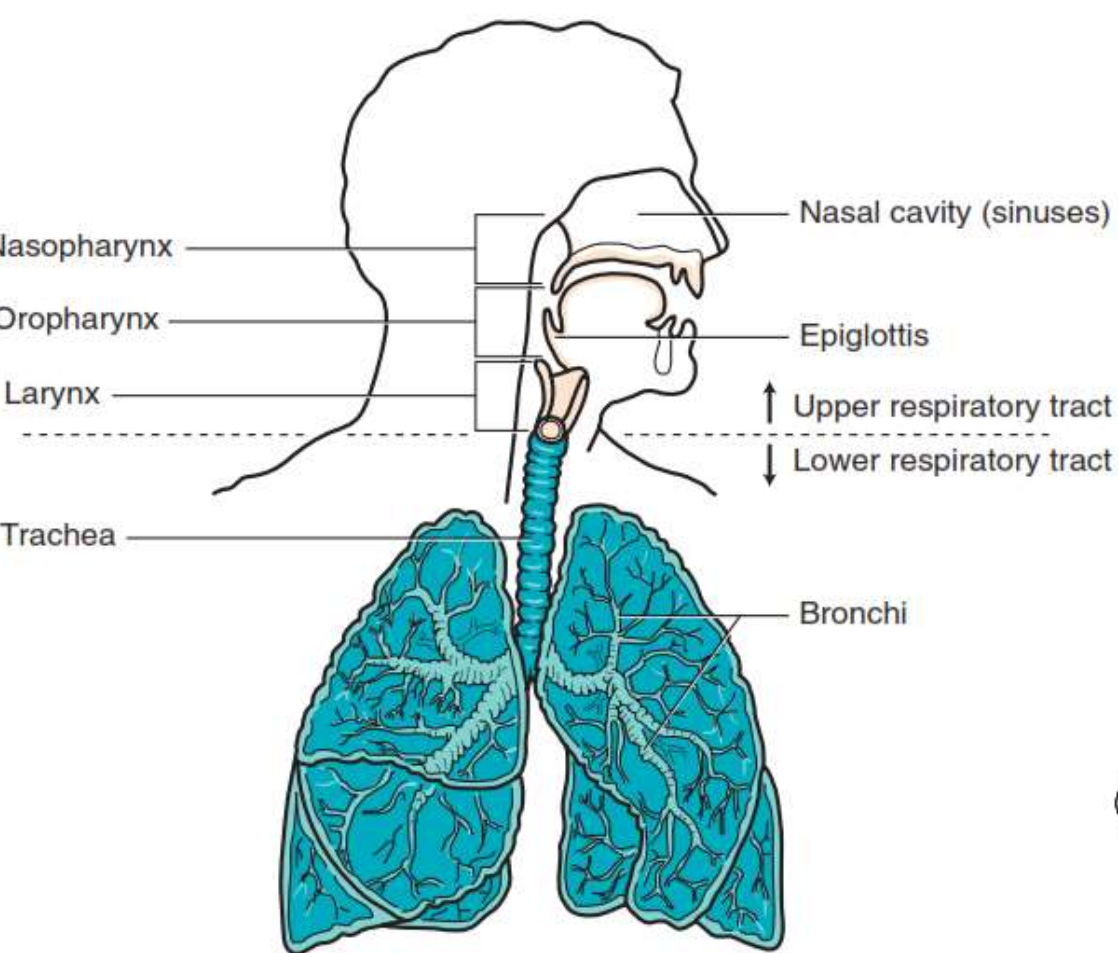
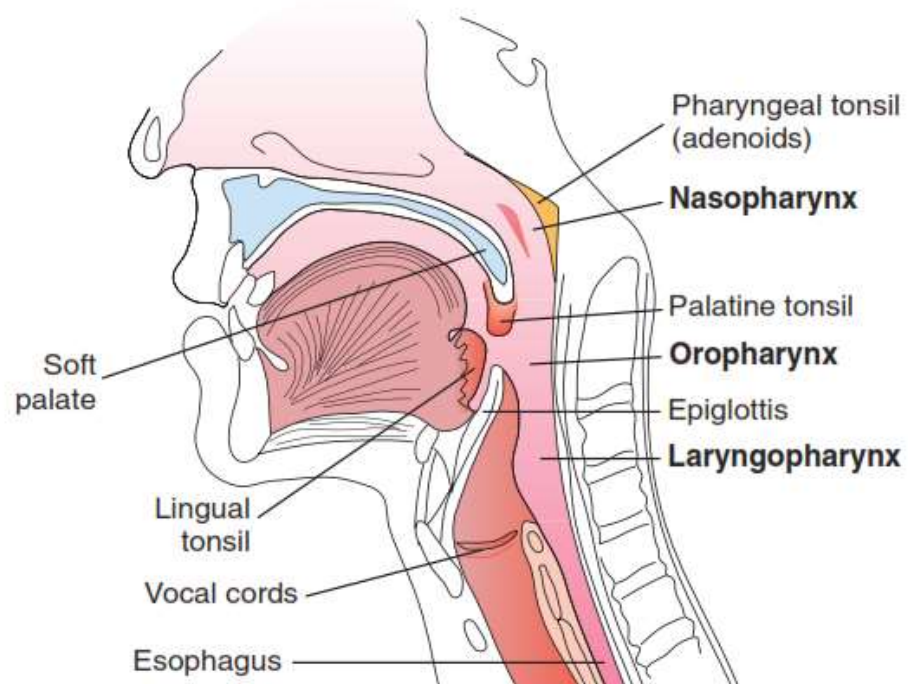


FIGURE 32-1 Anatomy of the respiratory tract.



• Figure 69-1 The pharynx, including its three divisions and nearby structures.

TABLE 32-2 Lower Respiratory Tract Infections

Clinical Syndrome	Causative Agents	Specimen Collection	Other
Bronchitis, bronchiolitis	<p><u>Most common</u> Respiratory viruses Respiratory syncytial virus (RSV) Influenza</p> <p><u>Less common</u> <i>Mycoplasma pneumoniae</i> <i>Chlamydomphila pneumoniae</i> <i>Bordetella pertussis</i></p>	Nasopharyngeal or lower respiratory sample if influenza, RSV, or pertussis infection is suspected. Diagnostic testing not indicated in uncomplicated cases.	<ul style="list-style-type: none"> • Viral polymerase chain reaction (PCR) test • Viral culture • Direct fluorescent antibody test (DFA) • Serology
Community-acquired pneumonia	<p>Children: <u>Most common</u> RSV Influenza A, B Parainfluenza 1, 2, 3 Adenovirus <i>M. pneumoniae</i></p> <p><u>Less common</u> <i>Streptococcus pneumoniae</i> <i>Staphylococcus aureus</i> <i>Haemophilus influenzae</i> Group B streptococci (neonates)</p> <p>Adults: <u>Most common</u> <i>S. pneumoniae</i></p> <p><u>Less common:</u> <i>M. pneumoniae</i> <i>H. influenzae</i> <i>Chlamydomphila pneumoniae</i> Respiratory viruses <i>Legionella pneumophila</i></p>	Deep expectorated sputum. Avoid contamination with oropharyngeal flora; specimen collection via fiberoptic bronchoscopy or open lung biopsy may be indicated in some cases.	<ul style="list-style-type: none"> • Bacterial culture • Viral PCR or antigen assays • <i>S. pneumoniae</i> and <i>Legionella</i> serogroup 1 urinary antigens • <i>Legionella</i> cultures on selective media (BCYE)
Health care-associated pneumonia	<p>Gram-negative bacilli <i>Staphylococcus aureus</i> <i>Streptococcus pneumoniae</i> <i>Haemophilus influenzae</i> <i>Legionella pneumophila</i></p>	Deep expectorated sputum. Avoid contamination with oropharyngeal flora; specimen collection via fiberoptic bronchoscopy or open lung biopsy may be indicated in some cases.	<ul style="list-style-type: none"> • Bacterial culture • <i>Legionella</i> serogroup 1 urinary antigens • <i>Legionella</i> cultures on selective media (BCYE)

Health care–associated pneumonia	<p><i>Legionella pneumophila</i> Gram-negative bacilli <i>Staphylococcus aureus</i> <i>Streptococcus pneumoniae</i> <i>Haemophilus influenzae</i> <i>Legionella pneumophila</i></p>	Deep expectorated sputum. Avoid contamination with oropharyngeal flora; specimen collection via fiberoptic bronchoscopy or open lung biopsy may be indicated in some cases.	<ul style="list-style-type: none"> • Bacterial culture • <i>Legionella</i> serogroup 1 urinary antigens • <i>Legionella</i> cultures on selective media (BCYE)
Aspiration pneumonia	Mixed aerobes and sometimes anaerobes	Expectorated sputum is of little value; bronchoscopic techniques are required for specific diagnosis. Pleural fluid cultures may be useful with anaerobic empyema.	<ul style="list-style-type: none"> • Bacterial culture
Chronic pneumonia	<i>Mycobacterium tuberculosis</i>	Early morning, deep expectorated sputum; bronchoscopy or open lung biopsy may be required to identify pathogen	<ul style="list-style-type: none"> • Acid-fast bacilli stain • Mycobacterial culture • Nucleic acid amplification assays for TB in sputum • Acid-fast bacilli stain • Mycobacterial culture
	Nontuberculous mycobacteria (including <i>Mycobacterium avium-intracellulare</i>)	Early morning, deep expectorated sputum; bronchoscopy or open lung biopsy may be required to identify pathogen	<ul style="list-style-type: none"> • Fungal cultures • Histopathology and fungal stains of tissue such as Gomori methenamine silver (GMS), calcofluor white, and periodic acid–Schiff (PAS) • Urinary antigen testing • Fungal culture • Histopathology and fungal stains of tissue
	<i>Blastomyces dermatitidis</i> <i>Histoplasma capsulatum</i>	Lower respiratory tract cultures or tissue. If extrapulmonary disease present, other tissue can be obtained for culture.	<ul style="list-style-type: none"> • Serology • Serum or cerebrospinal fluid cryptococcal antigen • Fungal culture • Histopathology and fungal stains of tissue
	<i>Coccidioides immitis</i>	Lower respiratory tract cultures or tissue. If extrapulmonary disease present, other tissue can be obtained for culture.	
	<i>Cryptococcus neoformans</i>		

TABLE 32-2 Lower Respiratory Tract Infections—cont'd

Clinical Syndrome	Causative Agents	Specimen Collection	Other
Empyema	<i>Aspergillus</i> spp.	Lower respiratory tract cultures or tissue. If extrapulmonary disease present, other tissue can be obtained for culture.	<ul style="list-style-type: none"> • Fungal culture • Histopathology and fungal stains of tissue • Galactomannan assay
	Zygomycetes	Lower respiratory tract cultures or tissue. If extrapulmonary disease present, other tissue can be obtained for culture.	<ul style="list-style-type: none"> • Fungal culture • Histopathology and fungal stains of tissue
	<i>Pneumocystis jirovecii</i>	Induced sputum or bronchoalveolar lavage specimen	<ul style="list-style-type: none"> • GMS stain if tissue • Direct fluorescent antibody (DFA) stain
	<u>Community-acquired</u> <i>S. pneumoniae</i> <i>S. aureus</i> <i>S. pyogenes</i> <i>S. anginosus</i> Anaerobes <i>Mycobacterium tuberculosis</i> <u>Health care-associated</u> Gram-negative bacilli Anaerobes	Pleural fluid should be aspirated directly into a sterile syringe, with excess air removed from syringe immediately.	<ul style="list-style-type: none"> • Bacterial culture Aliquots of specimen should be distributed to hematology and chemistry laboratories for other studies.

BCYE, Buffered charcoal yeast extract agar.

TABLE 32-3 Most Common Pathogens of Lower Respiratory Infections by Age

Age	Cause
Neonates	<i>Chlamydia trachomatis</i>
Children	
Infants	Respiratory syncytial virus Influenza virus
5-18 mo	<i>Streptococcus pneumoniae</i> <i>Haemophilus influenzae</i>
3 mo-19 yr	Viruses <i>Staphylococcus aureus</i> <i>Mycoplasma pneumoniae</i>
Young adults (18-45 yr)	<i>M. pneumoniae</i>
Older adults	<i>S. pneumoniae</i> <i>Legionella</i> spp.
Institutionalized adults	Gram-negative rods <i>S. pneumoniae</i> <i>S. aureus</i>

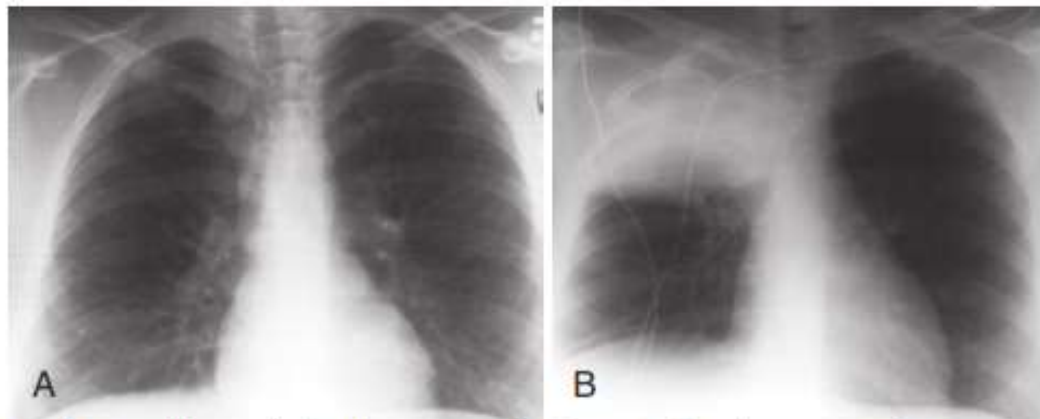


FIGURE 32-6 Chest radiographs before (A) and after (B) development of an acute, community-acquired, pneumococcal pneumonia. The patient is facing toward the reader. B, Consolidation of the right upper lobe of the lung is evidenced by the dense, whitish opacification of this lobe, which contrasts with the normal air (*black*) density of the remainder of the lung.

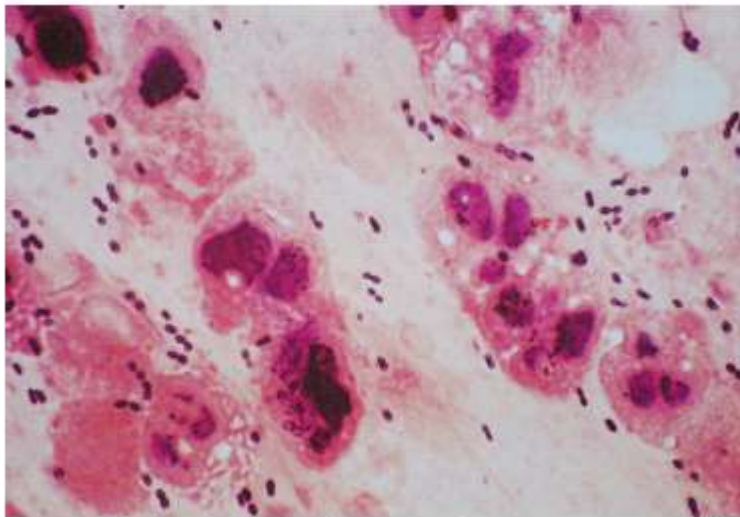


FIGURE 32-7 Gram-stained smear of sputum acceptable for culture, with white blood cells and gram-positive diplococci.

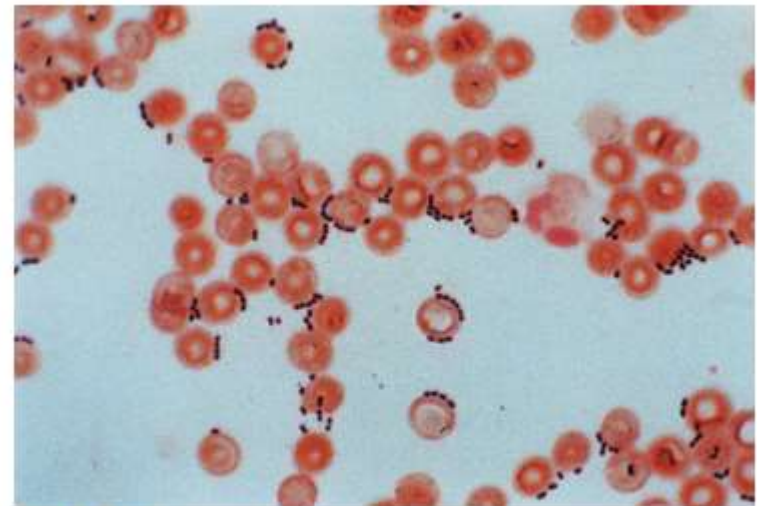
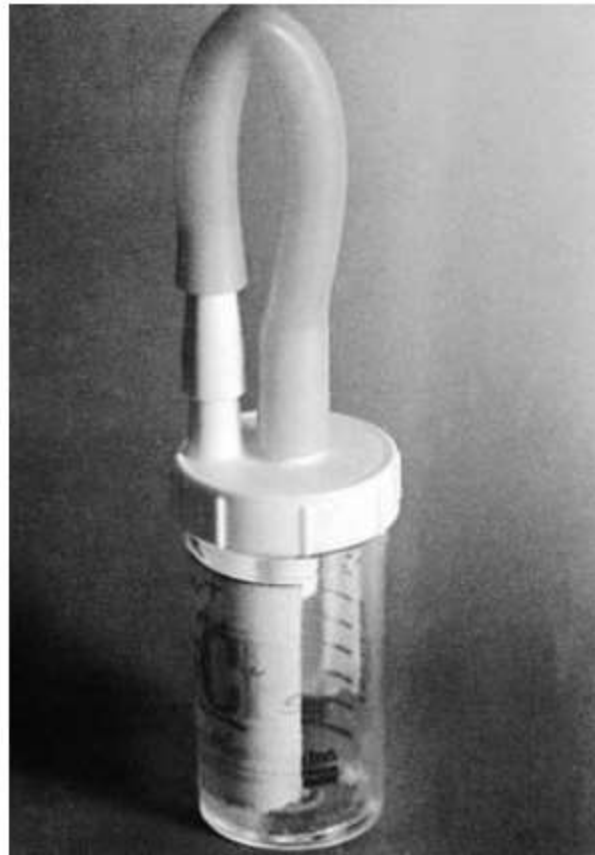


FIGURE 32-9 Gram-stained smear of *Streptococcus pneumoniae* isolated from the blood culture of a patient with pneumococcal pneumonia.

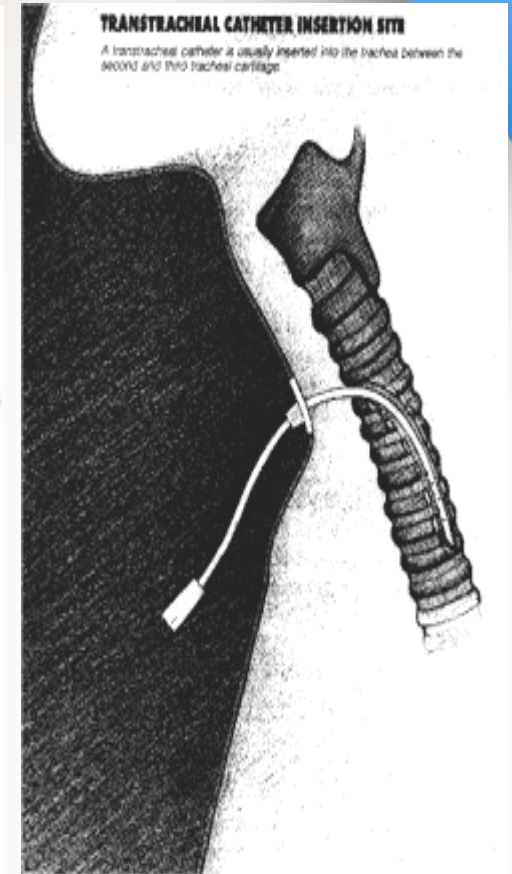
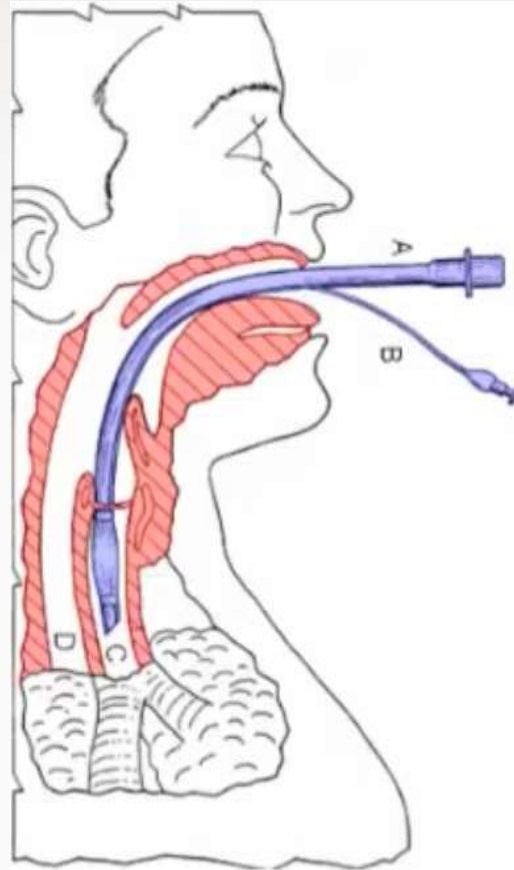
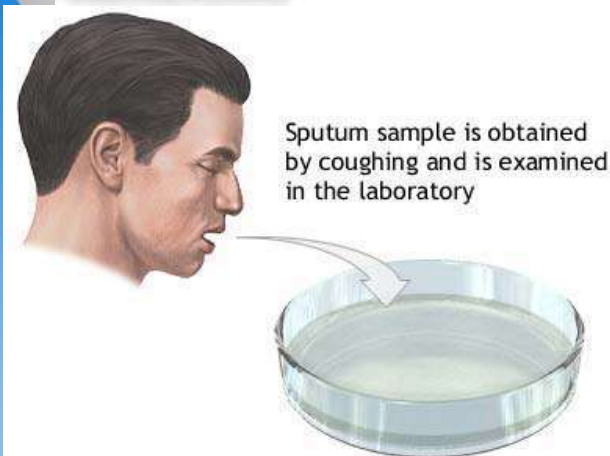
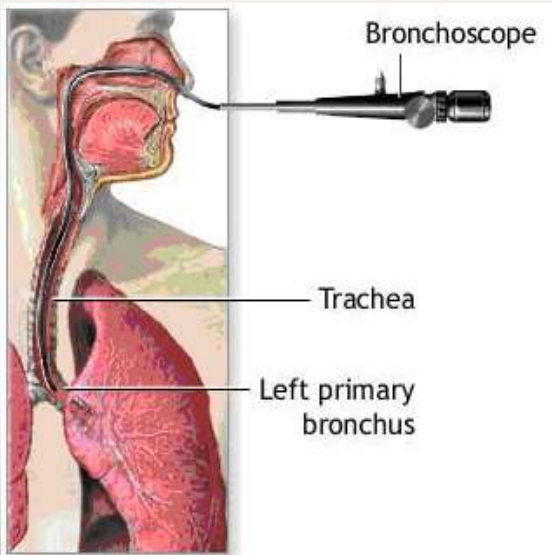
تشخیص آزمایشگاهی

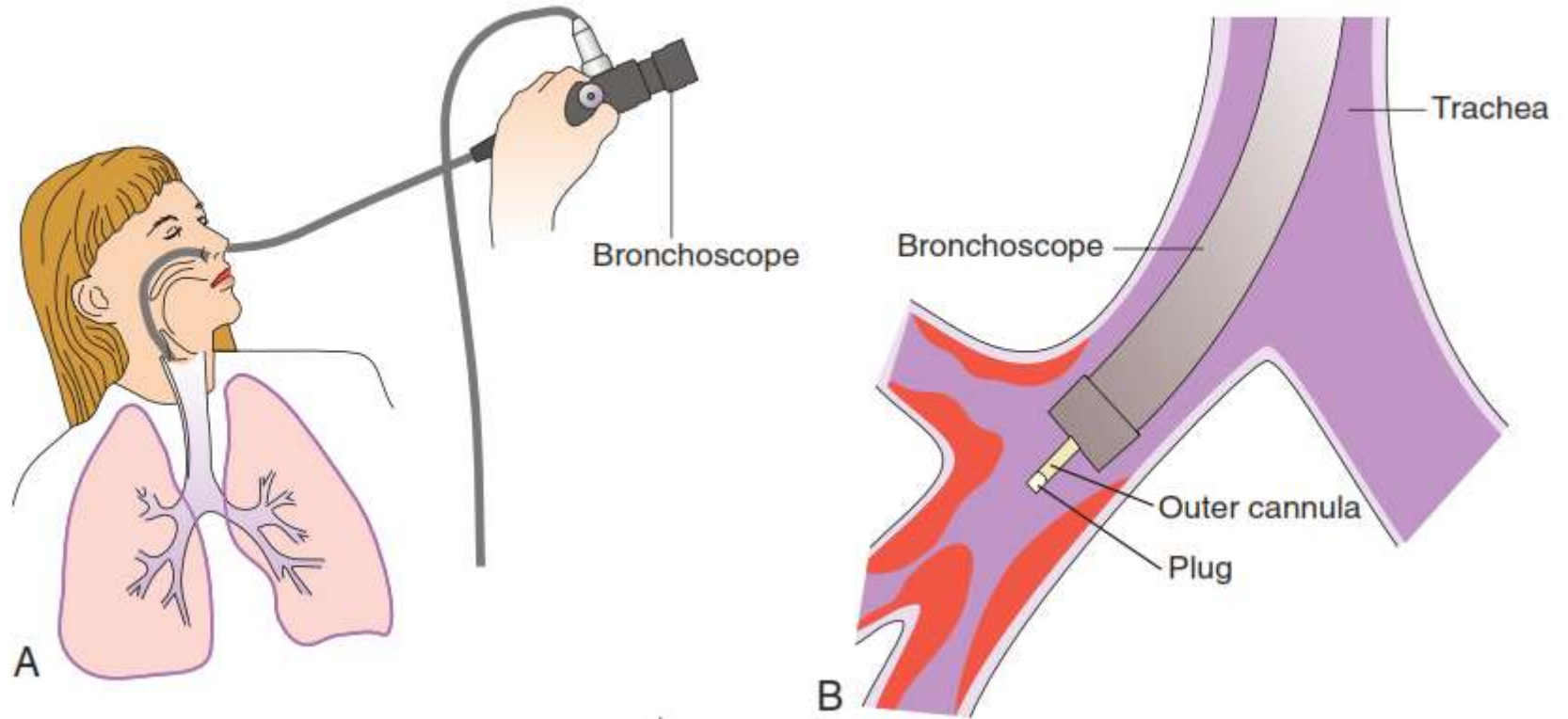


• **Figure 68-2** Tracheal secretions received in the laboratory in a Lukens trap.

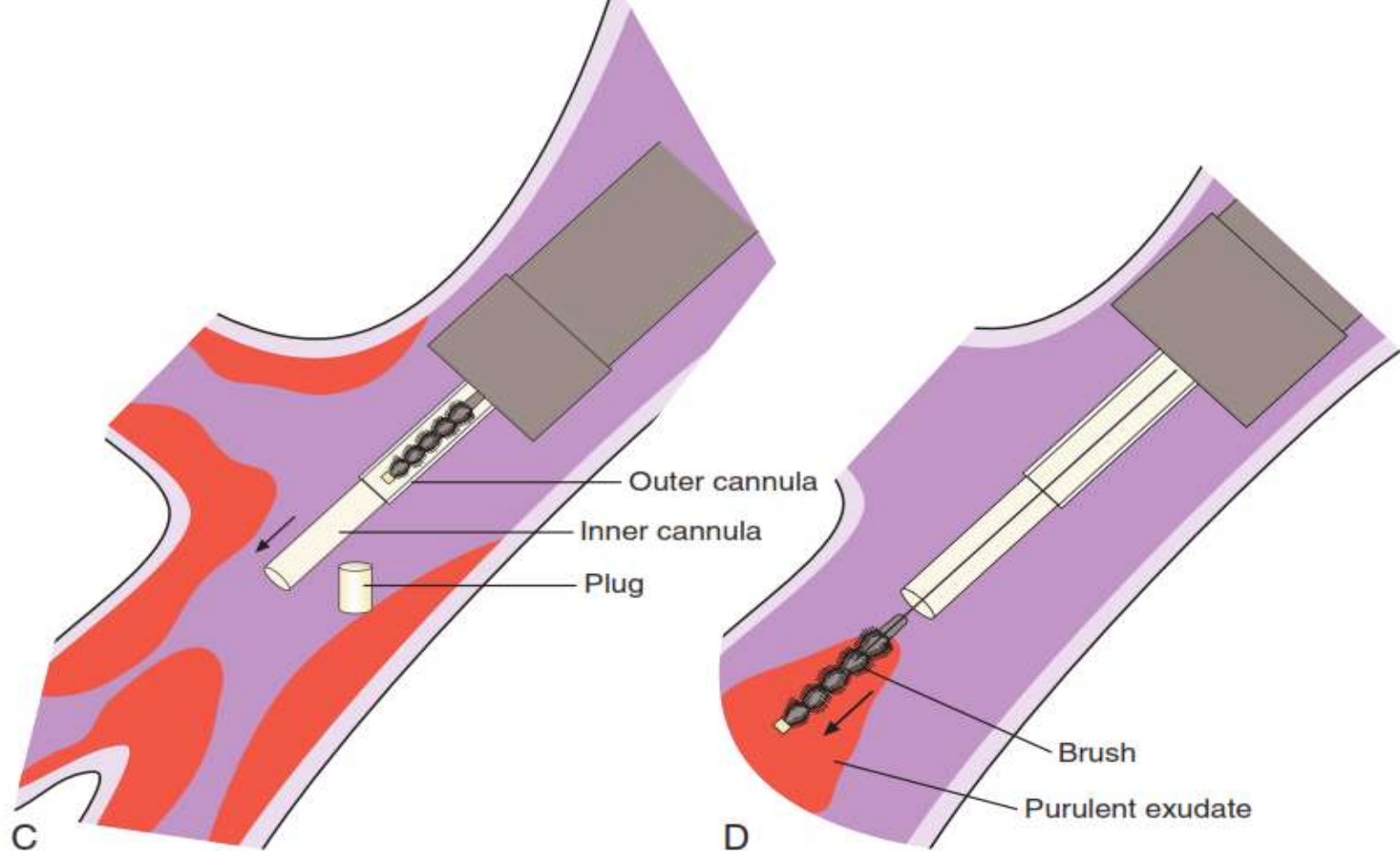
Types of specimen

- Expectorated, Transtracheal aspirates, Translaryngeal aspirates, Bronchoalveolar Lavage.





- Figure 68-3** Overview for obtaining a protected catheter bronchial brush during a bronchoscopy examination. **A**, The bronchoscope is introduced into the nose and advanced through the nasopharyngeal passage into the trachea. The bronchoscope is then inserted into the lung area of interest. **B**, A small brush that holds 0.001 to 0.01 mL of secretions is placed within a double cannula. The end of the outermost tube or cannula is closed with a displaceable plug made of absorbable gel. The cannula is inserted to the proper area. **C**, Once in the correct area, the inner cannula is pushed out, dislodging the protective plug



• **Figure 68-3** Overview for obtaining a protected catheter bronchial brush during a bronchoscopy examination. **A**, The bronchoscope is introduced into the nose and advanced through the nasopharyngeal passage into the trachea. The bronchoscope is then inserted into the lung area of interest. **B**, A small brush that holds 0.001 to 0.01 mL of secretions is placed within a double cannula. The end of the outermost tube or cannula is closed with a displaceable plug made of absorbable gel. The cannula is inserted to the proper area. **C**, Once in the correct area, the inner cannula is pushed out, dislodging the protective plug as it is extruded. **D**, The brush is then extended beyond the inner cannula, and the specimen is collected by “brushing” the involved area. The brush is withdrawn into the inner cannula, which is withdrawn into the outer cannula to prevent contamination by upper airway organisms as it is removed.

مواد و روش ها

ردیف	مواد لازم:		
۱	نمونه ی مجهول	۷	انکوباتور ۳۷ درجه
۲	لوپ	۸	کیت رنگ آمیزی گرم
۳	محیط نوترینت آگار (NA)	۹	محیط TSI , LIA
۴	محیط کشت MAC	۱۰	محیط ها و معرف های تست SIM IMViC ,SimonCitrat , MRVP
۵	معرف اکسیداز	۱۱	محیط کشت EMB

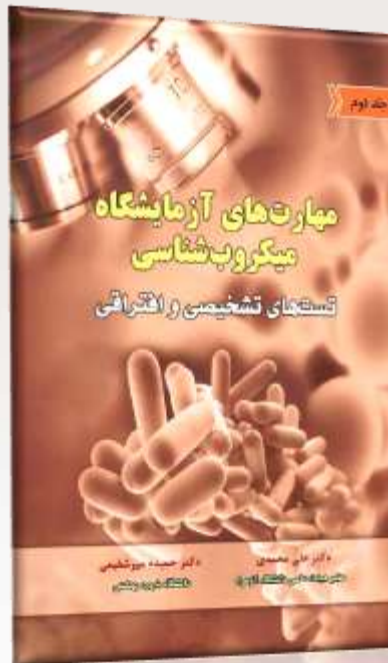
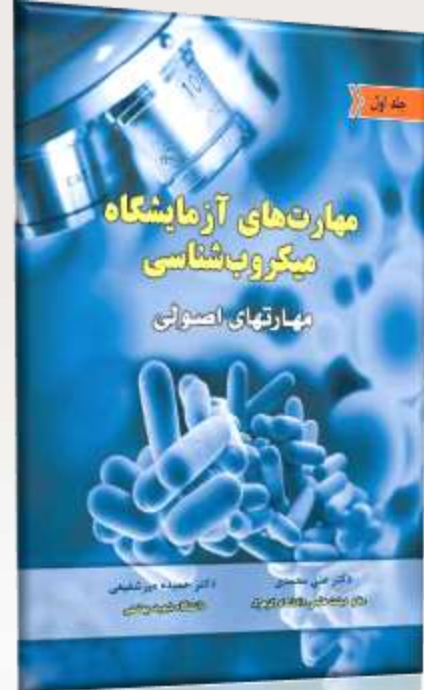
کار عملی

نمونه ی مجهول که متعلق به یکی از باکتری های آلوده کننده ی قسمت تحتانی دستگاه تنفس است در اختیار شما برای تشخیص قرار داده می شود.

(۱) کشت در NA و MAC

(۲) رنگ آمیزی گرم نمونه و توجه به رنگ بو و ظاهر کلنی.

(۳) با توجه به رنگ آمیزی گرم تست های تشخیصی احتمالی را در دو هفته متوالی با توجه به جدول تشخیص انجام دهید. تست تخمیر اکسیداز کاتالاز و



منابع:

- **مهارت های آزمایشگاه میکروبی شناسی** ، جلد ۱- ۳
- دکتر علی محمدی-عضو هیئت علمی دانشگاه الزهرا (س).
- دکتر حمیده میرشفیعی - دانشگاه شهید بهشتی
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