

VOLUME 1

PART 1 SCIENTIFIC PRINCIPLES OF RESPIRATORY MEDICINE

SECTION A

Anatomy and Development of the Respiratory Tract, 3

- 1 *Anatomy*, 3
KURT H. ALBERTINE, MARIA I. RAMIREZ, RORY E. MORTY
- 2 *Lung Growth and Development*, 24
XIN SUN, DAVID MCCULLEY
- 3 *Alveolar Compartment*, 33
WILLIAM J. ZACHARIAS, MICHAEL F. BEERS, ZEA BOROK
- 4 *Airway Biology*, 49
STEVEN L. BRODY, CHRISTOPHER M. EVANS
- 5 *Lung Mesenchyme*, 66
GAUTAM GEORGE, MARIA I. RAMIREZ, JESSE ROMAN
- 6 *Vascular Biology*, 76
YUANSHENG GAO, WOLFGANG M. KUEBLER, J. USHA RAJ
- 7 *Lymphatic Biology*, 88
SOUHEIL EL-CHEMALY, HASINA OUTTZ REED
- 8 *Regeneration and Repair*, 96
SUSANNE HEROLD, GREGORY P. DOWNEY
- 9 *Genetics of Lung Disease*, 106
MICHAEL H. CHO, DAVID A. SCHWARTZ

SECTION B

Respiratory Physiology, 116

- 10 *Ventilation, Blood Flow, and Gas Exchange*, 116
MEREDITH C. MCCORMACK, JOHN B. WEST
- 11 *Respiratory System Mechanics and Energetics*, 140
KRISTEN M. KIDSON, NAJIB T. AYAS, WILLIAM R. HENDERSON
- 12 *Acid-Base Balance*, 154
SARAH SANGHAVI, TYLER J. ALBERT, ERIK R. SWENSON
- 13 *Aerosols and Drug Delivery*, 168
THOMAS G. O'RIORDAN, GERALD C. SMALDONÉ
- 14 *Pleural Physiology and Pathophysiology*, 180
V. COURTNEY BROADDUS

SECTION C

Defense Mechanisms and Immunology, 191

- 15 *Innate Immunity*, 191
CLAUDIA V. JAKUBZICK, ELIZABETH F. REDENTE, DAVID W.H. RICHES, THOMAS R. MARTIN
- 16 *Adaptive Immunity*, 208
ANDREW P. FONTENOT, SHAIKH M. ATIF, R. LEE REINHARDT
- 17 *Microbiome*, 228
GEORGIOS KITSIOS, BRYAN J. MCVERRY, ALISON MORRIS

PART 2 DIAGNOSIS AND EVALUATION OF RESPIRATORY DISEASE

SECTION D

Diagnosis, 241

- 18 *History and Physical Examination*, 241
ELAINE FAJARDO, J. LUCIAN DAVIS
- 19 *Microbiologic Diagnosis of Lung Infection*, 254
NIAZ BANAEI, STANLEY C. DERESINSKI, BENJAMIN A. PINSKY
- 20 *Thoracic Radiology: Noninvasive Diagnostic Imaging*, 272
CLINTON E. JOKERST, MICHAEL B. GOTWAY
- 21 *Thoracic Radiology: Invasive Diagnostic Imaging and Image-Guided Interventions*, 300
RYAN WALSH, JEFFREY S. KLEIN
- 22 *Pathology: Neoplastic and Non-neoplastic Lung Disease*, 312
ANATOLY URISMAN, KIRK D. JONES, STEPHEN L. NISHIMURA
- 23 *Ultrasonography: Principles and Basic Thoracic and Vascular Imaging*, 330
AMY E. MORRIS, ROSEMARY ADAMSON, JAMES FRANK
- 24 *Ultrasonography: Advanced Applications and Procedures*, 343
CHRISTOPHER F. BARNETT, DANIEL A. SWEENEY, LINDSEY L. HUDDLESTON
- 25 *Positron Emission Tomography*, 355
CHRISTOPHE M. DEROOSE, CHRISTOPHE DOOMS
- 26 *Diagnostic Bronchoscopy: Basic Techniques*, 368
ELIF KÜPELI, ATUL C. MEHTA

27 *Diagnostic Bronchoscopy: Advanced Techniques (EBUS and Navigational),* 376

A. CHRISTINE ARGENTO, AJAY WAGH, DAVID FELLER-KOPMAN

28 *Therapeutic Bronchoscopy: Interventional Techniques,* 388

DAVID FELLER-KOPMAN, SAMIRA SHOJAEE

29 *Thoracoscopy,* 399

NAJIB M. RAHMAN, MOHAMMED MUNAWAR

30 *Thoracic Surgery,* 412

SHAMUS R. CARR, JOSEPH FRIEDBERG

SECTION E

Evaluation, 424

31 *Pulmonary Function Testing: Physiologic and Technical Principles,* 424

NIRAV R. BHAKTA, DAVID A. KAMINSKY

32 *Pulmonary Function Testing: Interpretation and Applications,* 439

NIRAV R. BHAKTA, SURYA P. BHATT

33 *Exercise Testing,* 454

ANDREW M. LUKS, ROBB W. GLENNY

34 *Preoperative Evaluation,* 472

KURT PFEIFER, GERALD W. SMETANA

35 *Evaluation of Respiratory Impairment and Disability,* 480

ANNYCE S. MAYER, LISA A. MAIER

PART 3 CLINICAL RESPIRATORY MEDICINE

SECTION F

Evaluation of Common Presentations of Respiratory Disease, 497

36 *Dyspnea,* 497

RICHARD M. SCHWARTZSTEIN, LEWIS ADAMS

37 *Cough,* 508

KIAN FAN CHUNG, STUART B. MAZZONE

38 *Chest Pain,* 521

BRETT E. FENSTER, TEOFILO L. LEE-CHIONG JR, G.F. GEBHART, RICHARD A. MATTHAY

39 *Wheezing And Stridor,* 532

JESSICA B. BADLAM, DAVID A. KAMINSKY

40 *Hemoptysis,* 539

YARON B. GESTHALTER, FAYEZ KHEIR

41 *Pulmonary Nodule,* 548

NICHOLE T. TANNER, MICHAEL GOULD, CHRISTOPHER G. SLATORE

42 *Positive Screening Test for Tuberculosis,* 559

CHRISTINA YOON

43 *Aspiration,* 569

RUPAL J. SHAH, VYVY N. YOUNG

44 *Hypoxemia,* 578

V. COURTNEY BROADDUS, ANTONIO GOMEZ

45 *Hypercapnia,* 590

BERNIE Y. SUNWOO, BABAK MOKHLESI

SECTION G

Infectious Diseases of the Lungs, 600

46 *Community-Acquired Pneumonia,* 600

DAVID H. DOCKRELL, ANTONIA HO, STEPHEN B. GORDON

46a *COVID-19,* 620

MONICA FUNG, JENNIFER M. BABIK, JOHN S. MUNGER, DAVID A. KAUFMAN

47 *Influenza,* 634

JUSTIN R. ORTIZ, T. EOIN WEST

48 *Hospital-Acquired Pneumonia,* 646

MARK L. METERSKY, ANDRE C. KALIL

49 *Ventilator-Associated Pneumonia,* 657

JEAN CHASTRE, CHARLES-EDOUARD LUYT

50 *Lung Abscess,* 668

NISHA H. GIDWANI

51 *Tuberculosis: Epidemiology and Prevention,* 674

PHILIP C. HOPEWELL, MIDORI KATO-MAEDA

52 *Tuberculosis: Pathogenesis and Immunity,* 684

JENNIFER A. PHILIPS, JOEL D. ERNST

53 *Tuberculosis: Clinical Manifestations and Diagnosis,* 692

PRIYA B. SHETE, ADITHYA CATTAMANCHI, CHRISTINA YOON

54 *Tuberculosis: Treatment of Drug-Susceptible and Drug-Resistant,* 708

DAVID J. HORNE, PAYAM NAHID

55 *Nontuberculous Mycobacterial Infections,* 725

CHARLES L. DALEY, KEVIN L. WINTHROP, DAVID E. GRIFFITH

56 *Fungal Infections: Endemic,* 748

JOSHUA D. NOSANCHUK, GEORGE R. THOMPSON III

57 *Fungal Infections: Opportunistic,* 763

JENNIFER L. SAULLO, BARBARA D. ALEXANDER

58 *Parasitic Infections,* 781

KAMI KIM, LOUIS M. WEISS

59 *Outbreaks, Pandemics, and Bioterrorism,* 797

WILLIAM A. FISCHER II, DAVID A. WOHL, DAVID J. WEBER, NICOLE LURIE

SECTION H

Obstructive Diseases, 807

- 60 Asthma: Pathogenesis and Phenotypes, 807**
PRESCOTT G. WOODRUFF, NIRAV R. BHAKTA, VICTOR ENRIQUE ORTEGA, BART N. LAMBRECHT, JOHN V. FAHY
- 61 Asthma and Obesity, 825**
ANNE E. DIXON, MICHAEL C. PETERS
- 62 Asthma: Diagnosis and Management, 831**
NUIRA LUGOGO, LORETTA G. QUE, TARA F. CARR, MONICA KRAFT
- 63 COPD: Pathogenesis and Natural History, 850**
JEFFREY L. CURTIS, MICHAEL H. CHO, NADIA N. HANSEL
- 64 COPD: Diagnosis and Management, 870**
MEILAN K. HAN, STEPHEN C. LAZARUS
- 65 Smoking Hazards: Cigarettes, Vaping, Marijuana, 890**
JEFFREY E. GOTTS, NEAL L. BENOWITZ
- 66 Smoking Cessation, 900**
PAUL G. BRUNETTA, LISA KROON
- 67 Cystic Fibrosis: Pathogenesis And Epidemiology, 910**
STEVEN M. ROWE, GEORGE M. SOLOMON, ERIC J. SORSCHER
- 68 Cystic Fibrosis: Diagnosis and Management, 919**
GEORGE M. SOLOMON, WYNTON HOOVER, ERIC J. SORSCHER, STEVEN M. ROWE
- 69 Bronchiectasis, 941**
GEORGE M. SOLOMON, EDWARD D. CHAN
- 70 Upper Airway Disorders, 961**
CLARK A. ROSEN, STEVEN D. PLETCHER
- 71 Large Airway Disorders, 982**
LAKSHMI MUDAMBI, MESHHELL JOHNSON, SUIL KIM
- 72 Bronchiolitis, 994**
JOHN R. GREENLAND, KIRK D. JONES, JONATHAN P. SINGER

VOLUME 2

SECTION I

Neoplasms of the Lung, 1005

- 73 Lung Cancer: Molecular Biology and Targets, 1005**
PIERRE P. MASSION, JONATHAN M. LEHMAN
- 74 Lung Cancer: Epidemiology, 1018**
DAVID C. CHRISTIANI, CHRISTOPHER I. AMOS
- 75 Lung Cancer: Screening, 1029**
LYNN TANOUE, PETER J. MAZZONE, NICHOLE T. TANNER
- 76 Lung Cancer: Diagnosis and Staging, 1039**
NICHOLAS J. PASTIS, ANNE V. GONZALEZ, GERARD A. SILVESTRI

- 77 Lung Cancer: Treatment, 1052**
M. PATRICIA RIVERA, GITA N. MODY, ASHLEY A. WEINER

- 78 Rare Primary Lung Tumors, 1066**
NICOLAS GIRARD, DOMINIQUE GOSSOT, LARA CHALABREYSSE, JACQUES CADRANEL

- 79 Metastatic Malignant Tumors, 1080**
DOUGLAS A. ARENBERG, RISHINDRA M. REDDY

- 80 Benign Lung Tumors, 1091**
KRISTINE KONOPKA, DOUGLAS A. ARENBERG

SECTION J

Disorders of the Pulmonary Circulation, 1101

- 81 Pulmonary Thromboembolism: Presentation and Diagnosis, 1101**

TIMOTHY A. MORRIS, ALEXANDRA ROSE

- 82 Pulmonary Thromboembolism: Prophylaxis and Treatment, 1123**

BRUCE L. DAVIDSON, C. GREGORY ELLIOTT

- 83 Pulmonary Hypertension: General Approach, 1141**

MATTHEW R. LAMMI, STEPHEN C. MATHAI

- 84 Pulmonary Arterial Hypertension: Group 1, 1159**

SONJA D. BARTOLOME, KELLY M. CHIN

- 85 Pulmonary Hypertension Due to Lung Disease: Group 3, 1171**

CHRISTOPHER F. BARNETT, TERESA DE MARCO

- 86 Pulmonary Hypertension Due to Chronic Thromboembolic Disease: Group 4, 1185**

TIMOTHY M. FERNANDES, KIM M. KERR

- 87 Pulmonary Vasculitis, 1194**

KEVIN K. BROWN, STEPHEN K. FRANKEL, CARLYNE D. COOL

- 88 Pulmonary Vascular Anomalies, 1212**

VIKRAMADITYA PRABHUDESAI, MARIE E. FAUGHNAN

SECTION K

Infiltrative and Interstitial Lung Diseases, 1221

- 89 Idiopathic Pulmonary Fibrosis, 1221**

JAY H. RYU, MOISÉS SELMAN, JOYCE S. LEE, THOMAS V. COLBY, TALMADGE E. KING JR

- 90 Nonspecific Interstitial Pneumonitis and Other Idiopathic Interstitial Pneumonias, 1235**

BRIDGET A. GRANNEY, JOYCE S. LEE, TALMADGE E. KING JR

- 91 Hypersensitivity Pneumonitis, 1248**

KERRI A. JOHANNSON, EVANS R. FERNÁNDEZ PÉREZ

- 92 Connective Tissue Diseases, 1262**

TAMERA J. CORTE, ATHOL U. WELLS

- 93 Sarcoidosis, 1284**
MARC A. JUDSON, LAURA L. KOTH, ROBERT P. BAUGHMAN
- 94 Diffuse Alveolar Hemorrhage, 1301**
MARVIN I. SCHWARZ, SCOTT MATSON
- 95 Pulmonary Langerhans Cell Histiocytosis and Other Rare Diffuse Infiltrative Lung Diseases, 1314**
ISABEL C. MIRA-AVENDANO, ROBERT VASSALLO
- 96 Eosinophilic Lung Diseases, 1322**
VINCENT COTTIN
- 97 Lymphangiomyomatosis, 1343**
FRANCIS X. MCCORMACK, NISHANT GUPTA, YOSHIKAZU INOUE
- 98 Pulmonary Alveolar Proteinosis Syndrome, 1363**
BRUCE C. TRAPNELL, CORMAC MCCARTHY
- 99 Drug-Induced Pulmonary Disease, 1378**
ANDREW H. LIMPER

SECTION L

Environmental and Occupational Hazards, 1395

- 100 Asthma in the Workplace, 1395**
CATHERINE LEMIERÉ, OLIVIER VANDENPLAS
- 101 Pneumoconioses, 1409**
LEONARD H.T. GO, ROBERT A. COHEN
- 102 Indoor and Outdoor Air Pollution, 1423**
JOHN RANDOLPH BALMES, STEPHANIE M. HOLM
- 103 Acute Responses to Toxic Exposures, 1435**
WARE G. KUSCHNER, PAUL D. BLANC
- 104 Trauma and Blast Injuries, 1447**
D. DANTE YEH, JARONE LEE
- 105 High Altitude, 1460**
ANDREW M. LUKS, ROBERT B. SCHOENE, ERIK R. SWENSON
- 106 Air Travel, 1475**
UMUR HATIPOĞLU, JAMES K. STOLLER
- 107 Diving Medicine, 1486**
MICHAEL S. LIPNICK, KAREN B. VAN HOESEN

SECTION M

Disorders of the Pleura, 1498

- 108 Pleural Effusion, 1498**
V. COURTNEY BROADDUS, RICHARD W. LIGHT
- 109 Pleural Infections, 1524**
ANNA C. BIBBY, NICK A. MASKELL
- 110 Pneumothorax, 1539**
ROB HALLIFAX, NAJIB RAHMAN

- 111 Chylothorax, 1551**
KEN K.P. CHAN, STUART M. LYON, Y.C. GARY LEE
- 112 Pleural Fibrosis and Unexpandable Lung, 1560**
AMELIA O. CLIVE, RAHUL BHATNAGAR
- 113 Hemothorax, 1570**
JOSEPH FRIEDBERG, SHELBY J. STEWART
- 114 Pleural Malignancy, 1575**
HELEN E. DAVIES, DANIEL STERMAN, Y.C. GARY LEE

SECTION N

Disorders of the Mediastinum, 1590

- 115 Mediastinal Tumors and Cysts, 1590**
MATTHEW TRIPLETT, THOMAS K. VARGHESE JR., GUANG-SHING CHENG
- 116 Mediastinitis and Fibrosing Mediastinitis, 1605**
ROBERT J. LENTZ, JAMES E. LOYD

SECTION O

Disorders of Sleep and Control of Breathing, 1618

- 117 Control of Breathing and Upper Airways During Sleep, 1618**
RICHARD L. HORNER, ATUL MALHOTRA
- 118 Consequences of Sleep Disruption, 1633**
VIDYA KRISHNAN, SANJAY R. PATEL
- 119 Sleep-Disordered Breathing: A General Approach, 1643**
ROBERT HIENSCH, NEOMI SHAH, KATHLEEN F. SARMIENTO
- 120 Obstructive Sleep Apnea, 1654**
R. JOHN KIMOFF, MARTA KAMINSKA, SUSHMITA PAMIDI
- 121 Central Sleep Apnea, 1670**
CLODAGH M. RYAN, T. DOUGLAS BRADLEY
- 122 Sleep-Disordered Breathing: Treatment, 1687**
STANLEY YUNG-CHUAN LIU, ANNA M. MAY, REENA MEHRA

SECTION P

Respiratory Manifestations of Extrapulmonary Disorders, 1703

- 123 Pulmonary Complications of HIV Infection, 1703**
KRISTINA CROTHERS, WILLIAM WORODRIA, LAURENCE HUANG
- 124 Pulmonary Complications of Primary Immunodeficiencies, 1728**
JAMES W. VERBSKY, JOHN M. ROUTES
- 125 Pulmonary Complications of Stem Cell and Solid Organ Transplantation, 1745**
GUANG-SHING CHENG, STEVEN A. PERGAM

- 126 Pulmonary Complications of Abdominal Diseases, 1758**
MELISSA H. TUKEY, BRYON D. QUICK, HILARY DUBROCK
- 127 Pulmonary Complications of Hematologic Diseases, 1773**
ROBERTO F. MACHADO, MARK T. GLADWIN
- 128 Pulmonary Complications of Endocrine Diseases, 1788**
MON Y. LEE, CONNIE C.W. HSIA
- 129 The Lungs in Obstetric and Gynecologic Diseases, 1799**
STEPHEN E. LAPINSKY, CATHERINE NELSON-PIERCY
- 130 The Respiratory System and Neuromuscular Diseases, 1812**
E. DENNIS MCCOOL, JANET HILBERT, LISA F. WOLFE, JOSHUA O. BENDITT
- 131 The Respiratory System and Chest Wall Diseases, 1829**
GEORGE E. TZELEPIS, ERIC J. GARTMAN, F. DENNIS MCCOOL

SECTION Q

- Management of Respiratory Failure, 1843**
- 132 Acute Ventilatory Failure, 1843**
NICHOLAS S. HILL, ERIK GARPESTAD, GREGORY L. SCHUMAKER

- 133 Pulmonary Edema, 1860**
NUALA J. MEYER, MICHAEL A. MATTHAY
- 134 Acute Respiratory Distress Syndrome, 1880**
ALEXANDRA BINNIE, MARGARET S. HERRIDGE, WARREN L. LEE
- 135 Mechanical Ventilation, 1903**
EWAN C. GOLIGHER, EDDY FAN
- 136 Noninvasive Support of Ventilation, 1918**
LAURENT J. BROCHARD, DAN E. ADLER, RICARDO LUIZ CORDIOLI, EVANGELIA AKOUMIANAKI
- 137 Noninvasive Support of Oxygenation, 1931**
SHUJING JIA, ROBERT C. HYZY
- 138 Extracorporeal Support of Gas Exchange, 1939**
NICOLÒ PATRONITI, GIACOMO GRASSELLI, ALBERTO ZANELLA, ANTONIO PESENTI
- 139 Pulmonary Rehabilitation, 1951**
CAROLYN L. ROCHESTER, LINDA NICI
- 140 Lung Transplantation, 1964**
ROBERT M. KOTLOFF, SHAF KESHAVJEE
- 141 End-of-Life Care in Respiratory Failure, 1980**
RENEE D. STAPLETON, DOUGLAS B. WHITE

Appendix, A-1

37. Cough

- Audio 37.1 Tactile wheezing cough
- Audio 37.2 Fine crackles
- Audio 37.3 Coarse crackles
- Audio 37.4 Wheezing
- Audio 37.5 Normal breath sounds

43. Aspiration

- Audio 43.1 Normal voice sound followed by egophony
- Audio 43.2 Crackles followed by egophony
- Audio 43.3 Normal whispered sound followed by crackles
- Audio 43.4 Normal whispered sound followed by egophony
- Audio 43.5 Normal whispered sound followed by crackles and egophony
- Audio 43.6 Normal whispered sound followed by crackles and egophony
- Audio 43.7 Normal whispered sound followed by crackles and egophony
- Audio 43.8 Normal whispered sound followed by crackles and egophony
- Audio 43.9 Normal whispered sound followed by crackles and egophony
- Audio 43.10 Normal whispered sound followed by crackles and egophony
- Audio 43.11 Normal whispered sound followed by crackles and egophony
- Audio 43.12 Normal whispered sound followed by crackles and egophony
- Audio 43.13 Normal whispered sound followed by crackles and egophony
- Audio 43.14 Normal whispered sound followed by crackles and egophony
- Audio 43.15 Normal whispered sound followed by crackles and egophony
- Audio 43.16 Normal whispered sound followed by crackles and egophony
- Audio 43.17 Normal whispered sound followed by crackles and egophony
- Audio 43.18 Normal whispered sound followed by crackles and egophony
- Audio 43.19 Normal whispered sound followed by crackles and egophony
- Audio 43.20 Normal whispered sound followed by crackles and egophony
- Audio 43.21 Normal whispered sound followed by crackles and egophony
- Audio 43.22 Normal whispered sound followed by crackles and egophony
- Audio 43.23 Normal whispered sound followed by crackles and egophony
- Audio 43.24 Normal whispered sound followed by crackles and egophony
- Audio 43.25 Normal whispered sound followed by crackles and egophony
- Audio 43.26 Normal whispered sound followed by crackles and egophony
- Audio 43.27 Normal whispered sound followed by crackles and egophony
- Audio 43.28 Normal whispered sound followed by crackles and egophony
- Audio 43.29 Normal whispered sound followed by crackles and egophony
- Audio 43.30 Normal whispered sound followed by crackles and egophony
- Audio 43.31 Normal whispered sound followed by crackles and egophony
- Audio 43.32 Normal whispered sound followed by crackles and egophony
- Audio 43.33 Normal whispered sound followed by crackles and egophony
- Audio 43.34 Normal whispered sound followed by crackles and egophony
- Audio 43.35 Normal whispered sound followed by crackles and egophony
- Audio 43.36 Normal whispered sound followed by crackles and egophony
- Audio 43.37 Normal whispered sound followed by crackles and egophony
- Audio 43.38 Normal whispered sound followed by crackles and egophony
- Audio 43.39 Normal whispered sound followed by crackles and egophony
- Audio 43.40 Normal whispered sound followed by crackles and egophony
- Audio 43.41 Normal whispered sound followed by crackles and egophony
- Audio 43.42 Normal whispered sound followed by crackles and egophony
- Audio 43.43 Normal whispered sound followed by crackles and egophony
- Audio 43.44 Normal whispered sound followed by crackles and egophony
- Audio 43.45 Normal whispered sound followed by crackles and egophony
- Audio 43.46 Normal whispered sound followed by crackles and egophony
- Audio 43.47 Normal whispered sound followed by crackles and egophony
- Audio 43.48 Normal whispered sound followed by crackles and egophony
- Audio 43.49 Normal whispered sound followed by crackles and egophony
- Audio 43.50 Normal whispered sound followed by crackles and egophony
- Audio 43.51 Normal whispered sound followed by crackles and egophony
- Audio 43.52 Normal whispered sound followed by crackles and egophony
- Audio 43.53 Normal whispered sound followed by crackles and egophony
- Audio 43.54 Normal whispered sound followed by crackles and egophony
- Audio 43.55 Normal whispered sound followed by crackles and egophony
- Audio 43.56 Normal whispered sound followed by crackles and egophony
- Audio 43.57 Normal whispered sound followed by crackles and egophony
- Audio 43.58 Normal whispered sound followed by crackles and egophony
- Audio 43.59 Normal whispered sound followed by crackles and egophony
- Audio 43.60 Normal whispered sound followed by crackles and egophony
- Audio 43.61 Normal whispered sound followed by crackles and egophony
- Audio 43.62 Normal whispered sound followed by crackles and egophony
- Audio 43.63 Normal whispered sound followed by crackles and egophony
- Audio 43.64 Normal whispered sound followed by crackles and egophony
- Audio 43.65 Normal whispered sound followed by crackles and egophony
- Audio 43.66 Normal whispered sound followed by crackles and egophony
- Audio 43.67 Normal whispered sound followed by crackles and egophony
- Audio 43.68 Normal whispered sound followed by crackles and egophony
- Audio 43.69 Normal whispered sound followed by crackles and egophony
- Audio 43.70 Normal whispered sound followed by crackles and egophony
- Audio 43.71 Normal whispered sound followed by crackles and egophony
- Audio 43.72 Normal whispered sound followed by crackles and egophony
- Audio 43.73 Normal whispered sound followed by crackles and egophony
- Audio 43.74 Normal whispered sound followed by crackles and egophony
- Audio 43.75 Normal whispered sound followed by crackles and egophony
- Audio 43.76 Normal whispered sound followed by crackles and egophony
- Audio 43.77 Normal whispered sound followed by crackles and egophony
- Audio 43.78 Normal whispered sound followed by crackles and egophony
- Audio 43.79 Normal whispered sound followed by crackles and egophony
- Audio 43.80 Normal whispered sound followed by crackles and egophony
- Audio 43.81 Normal whispered sound followed by crackles and egophony
- Audio 43.82 Normal whispered sound followed by crackles and egophony
- Audio 43.83 Normal whispered sound followed by crackles and egophony
- Audio 43.84 Normal whispered sound followed by crackles and egophony
- Audio 43.85 Normal whispered sound followed by crackles and egophony
- Audio 43.86 Normal whispered sound followed by crackles and egophony
- Audio 43.87 Normal whispered sound followed by crackles and egophony
- Audio 43.88 Normal whispered sound followed by crackles and egophony
- Audio 43.89 Normal whispered sound followed by crackles and egophony
- Audio 43.90 Normal whispered sound followed by crackles and egophony
- Audio 43.91 Normal whispered sound followed by crackles and egophony
- Audio 43.92 Normal whispered sound followed by crackles and egophony
- Audio 43.93 Normal whispered sound followed by crackles and egophony
- Audio 43.94 Normal whispered sound followed by crackles and egophony
- Audio 43.95 Normal whispered sound followed by crackles and egophony
- Audio 43.96 Normal whispered sound followed by crackles and egophony
- Audio 43.97 Normal whispered sound followed by crackles and egophony
- Audio 43.98 Normal whispered sound followed by crackles and egophony
- Audio 43.99 Normal whispered sound followed by crackles and egophony
- Audio 43.100 Normal whispered sound followed by crackles and egophony