



PATHOGENESIS, IMMUNITY, PATHOLOGY AND CLINICAL MANIFESTATIONS OF MEASLES

Boltaboyev Murodiljon Umarovich

Assistant of the Department Infectious Diseases of
Fergana Medical Institute of Public Health

Annotation

Measles (rubeola) is a highly contagious, acute, exanthematous respiratory disease with a characteristic clinical picture and a pathognomonic enanthem: Koplik's spots, an eruption on the buccal mucous membranes. Measles virus is the only member of the genus Morbillivirus that infects humans. Part of the family Paramyxoviridae, it is related to viruses causing similar infections in other mammals: distemper, rinderpest, morbilli, and peste des petits ruminants. There is only one antigenic type. Virions—pleomorphic spheres with a diameter of 100–250 nm—consist of six proteins. The inner capsid is composed of RNA and three proteins. The outer envelope consists of a matrix protein bearing short surface glycoprotein projections or peplomers, one a hemagglutinin (H) and the other a fusion (F) protein.

Keywords: reticuloendothelial system, paramyxoviridae, Warthin-Finkeldey cells, pneumonia, otitis media, malaise, cough, coryza, conjunctivitis, lacrimation, nasal discharge, fever.

Measles virus invades the respiratory epithelium and spreads via the bloodstream to the reticuloendothelial system, from which it infects white blood cells, thereby establishing infection of the skin, respiratory tract, and other organs. Both viremia and viruria develop. Multinucleated giant cells with inclusion bodies in the nucleus and cytoplasm (Warthin-Finkeldey cells) are found in respiratory and lymphoid tissues and are pathognomonic for measles. Direct invasion of T lymphocytes and increased levels of suppressive cytokines (e.g., interleukin 4) may play a role in the temporary depression of cellular immunity that accompanies and transiently follows measles. The major infected cell in the blood is the monocyte. Infection of the entire respiratory tract accounts for the characteristic cough and coryza of



Scientific Conference on Multidisciplinary Studies

Hosted online from Bursa, Turkey

Website: econfseries.com

11th June, 2025

measles and for the less frequent manifestations of croup, bronchiolitis, and pneumonia. Generalized damage to the respiratory tract, with loss of cilia, predisposes to secondary bacterial infections such as pneumonia and otitis media. Specific antibodies are not detectable before the onset of rash. Cellular immunity (consisting of cytotoxic T cells and possibly natural killer cells) plays a prominent role in host defense, and patients who are deficient in cellular immunity are at high risk for severe measles. Children with isolated agammaglobulinemia are not at increased risk. Immune reactions to the virus in the endothelial cells of dermal capillaries play a substantial role in the development of Koplik's spots (the pathognomonic enanthem) and rash; in immunodeficient hosts, measles may be severe despite the absence of these manifestations. Measles antigens have been demonstrated in involved skin during early stages of the illness. Pathologic changes in measles encephalitis include focal hemorrhage, congestion, and perivascular demyelination. Measles virus is rarely isolated from cerebrospinal fluid (CSF) in cases of encephalitis, which are thought to be due to the interaction of virus-infected cells with local cellular immune factors.

Measles begins with a 2- to 4-day respiratory prodrome of malaise, cough, coryza, conjunctivitis with lacrimation, nasal discharge, and increasing fever [with temperatures as high as 40.6°C (105°F), probably reflecting secondary viremia]. At this stage of the illness, in which the rash has not yet developed, influenza may be suspected. Just before rash onset, Koplik's spots appear as 1- to 2-mm blue-white spots on a bright red background. Without adequate illumination for examination, they may be overlooked. Koplik's spots are typically located on the buccal mucosa, alongside the second molars, and may be extensive; they are not associated with any other infectious disease. The spots wane after the onset of rash and soon disappear. The entire buccal and inner labial mucosa may be inflamed, and the lips may be reddened.

The characteristic erythematous, nonpruritic, maculopapular rash of measles begins at the hairline and behind the ears, spreads down the trunk and limbs to include the palms and soles, and often becomes confluent. At this time, the patient is at the most severe point of the illness. By the fourth day, the rash begins to fade in the order in which it appeared. Brownish discoloration of the skin and



Scientific Conference on Multidisciplinary Studies

Hosted online from Bursa, Turkey

Website: econfseries.com

11th June, 2025

desquamation may occur later. Fever usually resolves by the fourth or fifth day after the onset of rash; prolonged fever suggests a complication of measles. Lymphadenopathy, diarrhea, vomiting, and splenomegaly are common features. The chest x-ray may be abnormal, even in uncomplicated measles, because of the propensity of measles virus to invade the respiratory tract. The entire illness, which usually lasts ~10 days, tends to be more severe in adults than in children, with higher fever, more prominent rash, and a higher incidence of complications.

Milder forms of the illness with less intense symptoms and a milder rash, termed modified measles, may occur in individuals with preexisting partial immunity induced by active or passive vaccination. These patients include infants <1 year of age who retain some proportion of passively acquired maternal antibodies. On occasion, individuals with a history of immunization may develop modified measles.

Reference

1. Umarovich, B. M. (2025). DEVELOPING OF VIRAL INFECTIONS IN HEMATOPOIETIC STEM-CELL TRANSPLANT (HSCT) RECIPIENTS. Web of Medicine: Journal of Medicine, Practice and Nursing, 3(5), 468-473.
2. Muhammadiev, S. (2025). HEMIEPIPHYSIODESIS IN PEDIATRIC ORTHOPAEDICS AS A TREATMENT OF KNEE DEFORMITIES. International Journal of Artificial Intelligence, 1(4), 225-227.
3. Pulatjonovna, U. M. (2024). METABOLITE SYNDROME AND COGNITIVE IMPAIRMENT. IMRAS, 7(6), 419-423.
4. Умарова, М., & Кодиржонов, Н. (2022). ТРОМБОЛИТИЧЕСКАЯ ТЕРАПИЯ В ЛЕЧЕНИИ ИШЕМИЧЕСКОГО ИНСУЛЬТА. Theoretical aspects in the formation of pedagogical sciences, 1(5), 218-220.
5. Умарова, М. (2021). МИГРЕН КАСАЛЛИГИ ВА УНИНГ ШОШИЛИНЧ ТЕРАПИЯСИНИ ТАКОМИЛЛАШТИРИШ. ИНТЕРНАУКА, 47, 93.
6. Хошимова, А. Ё. (2018). ВЛИЯНИЕ ЗАГРЯЗНЕНИЯ ОКРУЖАЮЩЕЙ СРЕДЫ НА ЗАБОЛЕВАЕМОСТЬ БРОНХИАЛЬНОЙ АСТМОЙ. Актуальные вопросы современной пульмонологии. Ма, 200.



Scientific Conference on Multidisciplinary Studies

Hosted online from Bursa, Turkey

Website: econfseries.com

11th June, 2025

7. АБДУГАНИЕВА, А. Ё., & ЮЛДАШЕВА, Х. Б. К. ЛАБОРАТОРНАЯ ДИАГНОСТИКА ПРИ COVID-19. ИНТЕРНАУКА Учредители: Общество с ограниченной ответственностью "Интернаука", 37-38.
8. Умарова, М. (2021). ИНСОМНИЯ ВА МЕТАБОЛИК СИНДРОМНИНГ ЎЗАРО КОМОРБИДЛИГИ МУАММОНИНГ ДОЛЗАРБЛИГИ. Интернаука, (20-7), 29-30.
9. Исмаилов, С. И., & Маматханова, Г. М. (2022). ЭЛЕКТРОННЫЙ ДОКУМЕНТООБОРОТ КАК ВАЖНЕЙШИЙ ФАКТОР ПОВЫШЕНИЯ ЭФФЕКТИВНОСТИ УПРАВЛЕНИЯ ЗДРАВООХРАНЕНИЕМ. Евразийский журнал медицинских и естественных наук, 2(8), 38-45.
10. Erkinovich, M. B. (2023). Prevention and Modern Treatment of Fatty Embolism in Traumatological Patients. Eurasian Medical Research Periodical, 21, 158-164.
11. Abdujabborova, C. (2024). O'tkir zaharliligini aniqlash" LUPINUS AS". Universal xalqaro ilmiy jurnal, 1(9), 151-157.
12. Abdujabborova, C. (2024). PSORALEA DRUPACEAE BUNGE (PSORALEA KOSTYANKOVA OR AKKURAI) CHEMICAL COMPOSITION AND APPLICATION IN MEDICINE. B INTERNATIONAL BULLETIN OF MEDICAL SCIENCES AND CLINICAL RESEARCH (T. 4, Выпуск 1, сс. 9–14). Zenodo.
13. Erkinovich, M. B. (2025, February). ACCUMULATION OF FLUID IN THE KNEE JOINT. In The Conference Hub (pp. 31-35).
14. Erkinovich, M. B. (2025). EFFECT OF JOINT FLUID ON JOINT ACTIVITY IN THE BODY. Web of Medicine: Journal of Medicine, Practice and Nursing, 3(2), 256-260.
15. Maxmudovna, M. G., Qizi, S. M. I., & Xasanboyevich, X. S. (2024). VIRAL HEPATITIS DISEASE AND ITS SPREAD AMONG THE POPULATION. THE EXAMPLE OF RISHTAN DISTRICT. Eurasian Journal of Medical and Natural Sciences, 4(1-2), 118-121.
16. Mamatkhanova, G. M., & Ismailov, S. I. (2021). Optimization Of Medical Records And Implementation Of Electronic Systems In Healthcare. The



Scientific Conference on Multidisciplinary Studies

Hosted online from Bursa, Turkey

Website: econfseries.com

11th June, 2025

-
- American Journal of Medical Sciences and Pharmaceutical Research, 3(01), 193-198.
17. Маматханова, Г. (2021). Оптимизация медицинской учетной документации и внедрение электронных систем в здравоохранение. Общество и инновации, 2(8/S), 61-67.
18. Мурадимова, А. Р. (2019). Нейрофизиологический аспект метаболической терапии хронической церебральной ишемии. In Инновации в медицине. Материалы I международной научно-практической конференции-Махачкала, 2019.-Том. II.-232 с. (p. 192).
19. Lutfidin o'g'li, Y. B. (2025). ENDEMIK BUQUQ KASALLIGINI TA'SIRIDAN YO'LDOSH TERMINAL SO'RGICHLARDAGI QON TOMIRLARNING PATOMORFOLOGIK O'ZGARISHLARI. THEORY AND ANALYTICAL ASPECTS OF RECENT RESEARCH, 3(33), 322-325.
20. Lutfidin o'g'li, Y. B. (2025). Major Hystologic Types of Lung Cancer. Miasto Przyszłości, 57, 81-86.
21. Yusupov, B., & Xatamova, M. (2025). GIPERTIREOZ TA'SIRIDAN YO'LDOSH TERMINAL SO'RG'ICHLARDAGI QON TOMIRLARNING PATOMORFOLOGIK O'ZGARISHLARI. Modern Science and Research, 4(2), 432-437.
22. Habibullayevna, A. G., & Shavkatjon o'g'li, Q. S. (2025, February). STRUCTURE AND INTRACELLULAR ACTIVITY OF THE DNA-CONTAINING HERPES SIMPLEX VIRUS. In International Educators Conference (pp. 126-132).
23. Мурадимова, А. Р. (2019). КЛИНИКО-НЕВРОЛОГИЧЕСКИЕ ОСОБЕННОСТИ ТЕЧЕНИЯ СО-СУДИСТОЙ ЭПИЛЕПСИИ, ПРОГНОЗИРОВАНИЯ И ЛЕЧЕНИЯ. In Инновации в медицине. Материалы I международной научно-практической конференции-Махачкала, 2019.-Том. II.-232 с. (p. 178).
24. Мурадимова, А. Р. (2019). КЛИНИКО-ДИАГНОСТИЧЕСКИЕ АСПЕКТЫ И СОВРЕМЕННЫЕ ПОДХОДЫ К ЛЕЧЕНИЮ СОСУДИСТОЙ ДЕМЕНЦИИ. In Инновации в медицине. Материалы I международной



Scientific Conference on Multidisciplinary Studies

Hosted online from Bursa, Turkey

Website: econfseries.com

11th June, 2025

- научно-практической конференции-Махачкала, 2019.-Том. II.-232 с. (p. 185).
25. Xojiaqbarovna, K. M. (2025). SKLETAL MUSCLE RELAXANTS. PERIPHERALLY ACTING SKLETAL MUSCLE RELAXAXANTS: NEUROMUSCULAR BLOCKERS AND SYNTHETIC COMPETITIVE BLOCKERS. Web of Medicine: Journal of Medicine, Practice and Nursing, 3(5), 509-514.
26. Yevgenevna, S. O. (2025). PREDICTION OF PREECLAMPSIA DEVELOPMENT IN PREGNANT WOMEN WITH OVERWEIGHT AND OBESITY. Web of Medicine: Journal of Medicine, Practice and Nursing, 3(5), 561-568.
27. Solijon o'g'li, A. S. (2024). Antibiotic Therapy for Severe Infections in Infants and Children. Innovative Society: Problems, Analysis and Development Prospects (Spain), 6, 21-24.
28. Solijon o'g'li, A. S. (2024, May). Measles in Children, its Symptoms and Treatment. In International Congress on Biological, Physical And Chemical Studies (ITALY) (pp. 102-106).
29. Isroilova, G. (2023). DEVELOPING THE PRINCIPLES OF STUDYING AND TREATMENT OF VAGINAL DYSBIOSIS DURING PREGNANCY. Modern Science and Research, 2(4), 52-53.
30. Юсупова, Р. Т., & Шаланкова, О. Е. (2020). РЕПРОДУКТИВНОЕ ЗДОРОВЬЕ ДЕВОЧЕК-ПОДРОСТКОВ, ПРОЖИВАЮЩИХ В УСЛОВИЯХ ФЕРГАНСКОЙ ДОЛИНЫ. In Университетская наука: взгляд в будущее (pp. 612-614).
31. Пулатова, Н. С., Йигиталиев, А. Б., & Абдурашидов, А. А. ЭПИДЕМИОЛОГИЯ РАКА ТЕЛА МАТКИ В ФЕРГАНСКОЙ ОБЛАСТИ. 1-SON, 1-JILD IYUL 2022 1-QISM, 29.
32. Эгамбердиев, Д. Э., Абдурашидов, А. А., & Эргашов, У. Ш. ПРОФИЛАКТИКА И МЕТОФИЛАКТИКА МОЧЕКАМЕННОЙ БОЛЕЗНИ.
33. Husanboy, U. (2024). ACUTE HEMORRHAGIC CYSTITIS DISEASE IN CHILDREN AND ITS DEVELOPMENT IN THE CHILD'S BODY. In



Scientific Conference on Multidisciplinary Studies

Hosted online from Bursa, Turkey

Website: econfseries.com

11th June, 2025

-
- International Conference on Multidisciplinary Sciences and Educational Practices (pp. 88-94).
34. Умарова, М. (2021). ИНСУЛТДАН КЕЙИНГИ ТАЛВАСА СИНДРОМИ. Интернаука, (18-5), 46-48.
35. Pattoyevich, G. A. (2025). IRON DEFICIENCY ANEMIA IN CHILDREN: EARLY DIAGNOSIS AND MODERN TREATMENT APPROACHES. Web of Medicine: Journal of Medicine, Practice and Nursing, 3(5), 494-501.
36. Ravshanovna, R. Y., & Abduxoliq o'g'li, R. A. (2024). Clinical and Morphological Characteristics and Treatment of Gaucher Disease. Miasto Przyszłości, 49, 1407-1412.