

OLXO'RI CHECHAK VIRUSINING TURLI SHTAMMLARI VA IZOLYATLARINING BIOINFORMATIK TAHLILI

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ANNOTATSIYA: Hozirda dunyo mamlakatlari orasida fitopatogen viruslarning salbiy ta'siri rivojlanib bormoqda. Bu esa import va eksportning ortishi hamda mamlakatlar rivoji uchun yomon ta'sir ko'rsatmoqda. Shu bilan bir qatorda o'simlik viruslariga o'xshash patogen organizmlar ham bir mintaqadan boshqa mintaqaga o'tib tarqalishi tezlashmoqda. Bu esa ko'plab danak mevali o'simliklarni nobud bo'lishiga olib kelishi tabiiy hodisadir. Ushbu maqolada olxo'ri chechak virusining turli shtammlari bioinformatik tahlil natijalari haqida fikr yuritiladi [1].

Kalit So'zlar. Olxo'ri chechagi virusi, izolyat, shtamm, NCBI, Patogen organizmlar, Potyvirus, Prunus jinsi, vegetativ ko'payish, shtamm.

BIOINFORMATIC ANALYSIS OF DIFFERENT STRAINS AND ISOLATES OF PLUM POUCH VIRUS

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ABSTRACT: Currently, the negative impact of phytopathogenic viruses is developing among the countries of the world. This has a negative impact on the increase in imports and exports and the development of countries. At the same time, pathogenic organisms similar to plant viruses are also spreading from one

region to another. This is a natural phenomenon that leads to the death of many pome fruit plants. This article discusses the results of bioinformatic analysis of different strains of plum pox virus [1].

Keywords. Plum pox virus, isolate, strain, NCBI, Pathogenic organisms, Potyvirus, Prunus genus, vegetative propagation, strain.

Kirish. Olxo‘ri chechagi virusi izolyatlarning boshqa izolyatlar bilan qarindoshlik darajasini aniqlash NCBI bazasida mavjud BLASTn dasturi yordamida amalga oshirildi. Natijada Uzb1 (MT038048.1) izolyatiga LT600780.1 (Qozog‘iston) 99,23%, MT038050.1 (Uzb2) izolyatiga 99,31%, LT600781.1 izolyatiga 99,16% (Qozog‘iston), MT038049.1 izolyatiga 99,14% (Uzb3), LT600782.1 izolyatiga 99,08% (Qozog‘iston), GU461890.1 izolyatiga esa 99,00% (Slovakia) gomologiyaga ega ekanligi va bu izolyatlar eng yaqin izolyatlar sifatida aniqlangan bo‘lsa, qolgan MW251495.1 izolyatiga 98,85% (Chexiya) yaqinligi, ushbu izolyatdan boshlab qarindoshlik darajasining boshqa izolyatlar bilan pasayib borishi aniqlandi (<https://blast.ncbi.nlm.nih.gov>).

Shu o‘rinda olxo‘ri chechak virusining D shtammining bioinformatik tahlili ustida ham ilmiy izlanishlar olib borildi. Ushbu ishlar davomida yuqoridagi izolyatning nukleotidlar ketma-ketligi bo‘yicha O‘zbekistondagi D shtammi va boshqa dunyo mamlakatlaridan aniqlangan turli shtammlari bilan o‘zaro solishtirildi, o‘xshashlik va farqlari o‘rganildi (1-rasm).

MT038049_Plum_pox_virus_strain_D_isolate_Uz3_Uzbekistan	-----GCACCAAGCTGA	12
OK285056_Plum_pox_virus_strain_T_Turkey	AGCATTTTACAATGATATTGATGATAGCCTTGACTCCAACATTGTTGTACACCGGCTGA	60
MN734791_Plum_pox_virus_strain_Rec_Russia	-----ACACCAAGGCTGA	12
MW415808_Plum_pox_virus_strain_M_Turkey	-----ACACCAAGGCTGA	12
HQ670746_Plum_pox_virus_strain_W_Latvia	-----CCAGGCAACGA	12
MW650874_Plum_pox_virus_strain_C_Russia	-----GGCCAAGGAGGG	12
MW650878_Plum_pox_virus_strain_CV_Russia	-----GGCGAACGAGGG	12
MG736812_Plum_pox_virus_strain_CR_Russia	-----GGCAAAATGAAGG	12
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MT038049_Plum_pox_virus_strain_D_isolate_Uz3_Uzbekistan	CGAAAAGAGAAGACGAGGAGGAAGTTGATGCAGGCAAGCCAATTGTAGTTACTGCACCGGC	72
OK285056_Plum_pox_virus_strain_T_Turkey	CGAAAAGGAGGACGATGAAGAAGTTGATGCAGGAAAGCCTATTGTGGTAACGCACCGGT	120
MN734791_Plum_pox_virus_strain_Rec_Russia	TGAAAAGGAGGACGATGAAGAAGTTGATGCAGGAAACCCACTGTAGTAACGCACCGGC	72
MW415808_Plum_pox_virus_strain_M_Turkey	TGAAAAGGAGGACGATGAAGAAGTTGATGCAGGAAAGACCTACTGTGGTAACGCACCGGC	72
HQ670746_Plum_pox_virus_strain_W_Latvia	GGAAGATGACGATTCAACTGTAGTAGATGCAGGCAGGCAGCTCTCCAGCGCAACACCC	72
MW650874_Plum_pox_virus_strain_C_Russia	AGATAATGACGACGTAACCTAGTGGATGCAGGCAAGTCTACTGTCTACTACAGCAGCTTC	72
MW650878_Plum_pox_virus_strain_CV_Russia	GGATGATGATAACGTAACCTTTGGTTGATGCAGGTAATCCACCGTCACCACAGCAGCGTC	72
MG736812_Plum_pox_virus_strain_CR_Russia	CGGTGACGATGATGTGACGTTAGTGGACGCGAGTAAATCCACTGTCCACACAGCAGCAAC	72
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MT038049_Plum_pox_virus_strain_D_isolate_Uz3_Uzbekistan	AGCAACTAGCCC---AATACTTCAACCACCTCCAGTCATACAGCCTGCACCCCGGACTAC	129
OK285056_Plum_pox_virus_strain_T_Turkey	AGCAACTGTGGC---AACAACCTCAACCAGCTCCATTGTATACAACCTGCACCTCGAACCAC	177
MN734791_Plum_pox_virus_strain_Rec_Russia	AGCAACTGTGGC---AACAACCTCAACCAGCTCCAGTGATACAACCTGCAATTCAAACCAC	129
MW415808_Plum_pox_virus_strain_M_Turkey	AGCAACTGTGGC---AACAACCTCAACCAGCTCCAGTGATACAACCTGCAATTCGAACCAC	129
HQ670746_Plum_pox_virus_strain_W_Latvia	TCCATCTACTACACGGCGTACAGGCAACAGCTACATCGACTCAACCTCTGCAGAGCAC	132
MW650874_Plum_pox_virus_strain_C_Russia	CACACCTGCASTAACAAGCTCACAATTTCCACCTCCACCATTCCTCAAAATCTGCGGAGCAC	132
MW650878_Plum_pox_virus_strain_CV_Russia	CACACCTGCAACAACAAGCTCGCAATTGCCACCACCACCATTCCTCGAGCCTGCAGAATAC	132
MG736812_Plum_pox_virus_strain_CR_Russia	TACACCAATCACAACAAGCGCACAGCTGCCGCCTCCGGTGTCTCCACAATTCGCAAGCAC	132
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MT038049_Plum_pox_virus_strain_D_isolate_Uz3_Uzbekistan	GGCGCCAATGTTCAACCCCATTTTCACGCCAGCAACAACCTCAACCAGCAACAAAACAGT	189
OK285056_Plum_pox_virus_strain_T_Turkey	AGCACCAATGTTCAACCCCATTTTCACTCCAGCAACAACCTCAGCCTGCGATAAAACCAAT	237
MN734791_Plum_pox_virus_strain_Rec_Russia	AACACCAATGTTCAACCCCATTTTCACTCCAGCAACAACCTCAGCCTGCGATAAGACCAAT	189
MW415808_Plum_pox_virus_strain_M_Turkey	AGCACCAATGTTCAATCCCATTTTCACTCCAGCAACAACCTCAGCCTGCGGTAAGACCAAT	189
HQ670746_Plum_pox_virus_strain_W_Latvia	AACGTCAATGTTCAACCCCGTCTTACGCCAGCAACAACCTCAACCGAGCTTGAAGCCAGC	192
MW650874_Plum_pox_virus_strain_C_Russia	GGCACCAATGTTTGATCCCATATTTCACTCCAGCAACAACCGCCAAATGTGAGACCGAT	192
MW650878_Plum_pox_virus_strain_CV_Russia	GCCACCAATGTTGACCCCTATTTTACTCCGGCAACAACCTCAGCCAAGTGTGAGACCGAT	192
MG736812_Plum_pox_virus_strain_CR_Russia	GACACCAATGTTGCAACCCATTTTCACTCCAGCAACAACCTCAGCCGACCATAAACCAAT	192
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MT038049_Plum_pox_virus_strain_D_isolate_Uz3_Uzbekistan	TGCCTTTGATTTTACGAAATGACTTCAACGACACCCGTACGGGCACGTGAAGCTCATAT	849
OK285056_Plum_pox_virus_strain_T_Turkey	CGCCTTTGATTTTACGAAATGACTTCAACACGCCTGTGCGTGCACGTGAAGCTCATAT	897
MN734791_Plum_pox_virus_strain_Rec_Russia	CGCCTTTGATTTTACGAAATGACTTCAACACGCCTGTGCGTGCACGTGAAGCTCACAT	849
MW415808_Plum_pox_virus_strain_M_Turkey	CGCCTTTGATTTTACGAAATGACTTCAACACGCCTGTGCGTGCACGTGAAGCTCATAT	849
HQ670746_Plum_pox_virus_strain_W_Latvia	TGCCTTTGATTTCTATGAGATGACCTCGACACACCTGTAGGGGCACGTGAGGCACATAT	849
MW650874_Plum_pox_virus_strain_C_Russia	TGCCTTTGATTTCTACGAGATGACCTCGACACACGCCTGTGAGGGCTCGTGAGGCACATAT	849
MW650878_Plum_pox_virus_strain_CV_Russia	TGCCTTTGATTTCTACGAGATGACCTCAACGACACCCGTAAAGGCACGAGAGGCACATAT	849
MG736812_Plum_pox_virus_strain_CR_Russia	CGCCTTTGATTTTATGAGATGACCTCGACACACCCGTAAAGGCACGAGAGGCACACAT	849
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MT038049_Plum_pox_virus_strain_D_isolate_Uz3_Uzbekistan	CCAGATGAAGGCAGCAGCATTGAGAAATGTTCAAATCGTTTATTGGCTTGGATGGAAA	909
OK285056_Plum_pox_virus_strain_T_Turkey	ACAGATGAAGGCAGCAGCATTGAGAAATGTTCAGAATCCTTTATTGGCTTGGATGGAAA	957
MN734791_Plum_pox_virus_strain_Rec_Russia	ACAGATGAAGGCAGCAGCATTGAGAAATGTTCAGAATCGTTTATTGGCTTGGATGGAAA	909
MW415808_Plum_pox_virus_strain_M_Turkey	ACAGATGAAGGCAGCAGCATTGAGAAATGTTCAAATCGTTTATTGGCTTGGATGGAAA	909
HQ670746_Plum_pox_virus_strain_W_Latvia	TCAAATGAAGGCAGCAGCATTGAGAAATGTTCAGAATCGTTTATTGGCTTGGATGGAAA	909
MW650874_Plum_pox_virus_strain_C_Russia	TCAAATGAAGGCAGCAGCATTGAGAAATGTTCAAATCGTTTATTGGCTTGGATGGAAA	909
MW650878_Plum_pox_virus_strain_CV_Russia	TCAGATGAAGGCAGCAGCATTGAGAAACACTCAGAATCGTTTATTGGCTTGGATGGAAA	909
MG736812_Plum_pox_virus_strain_CR_Russia	TCAAATGAAGGCAGCAGCATTGAGAAACACTCAGAATCGTTTATTGGCTTGGATGGAAA	909
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1-rasm. Olxo‘ri chechagi virusining turli shtammlarining nuklein kislotalar farqi

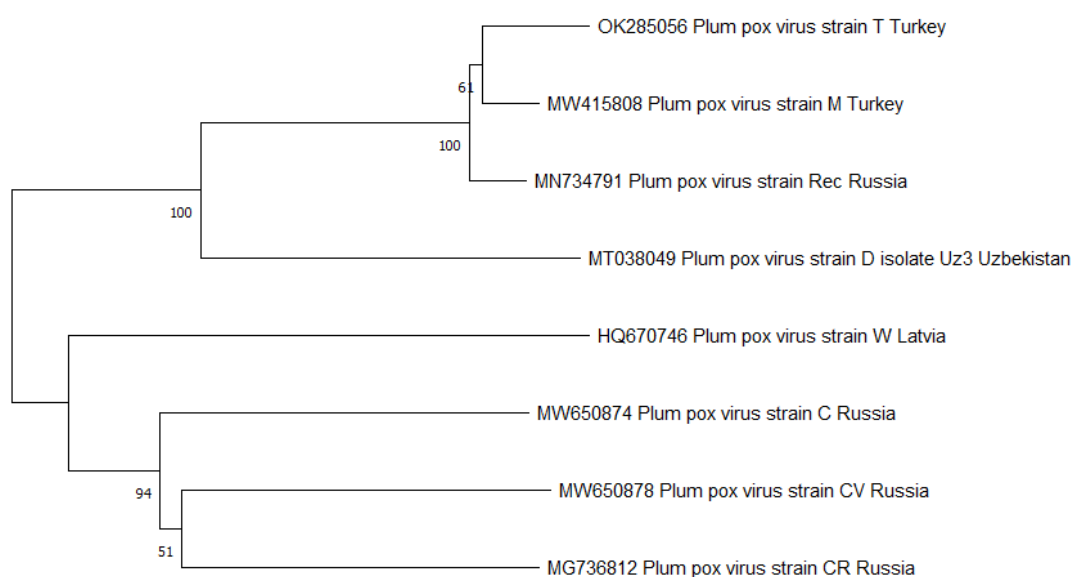
Yuqoridagi natijalar shuni ko‘rsatdiki, shtammlar orasida SNP mutatsiyasi hamda o‘xshashliklar kuzatildi. Bu o‘zgarish aminokislotalar orasida ham mutatsiyalar olib kelganligini aniqlash uchun ClustalW online bioinformatik dasturi yordamida tahlil qilindi. Shu bilan bir qatorda OChVning Ozbekiston iqlim sharoitidan aniqlangan izolyatlari hamda unga eng yaqin shtammlarning nukleotidlar tarkibining FASTA dasturi yordamida qiyosiy tahlili ko‘plab mutatsiya nuqtasining mavjudligini ko‘rsatdi, bu esa o‘z navbatida oqsil qobig‘i aminokislota tarkibini o‘rganishni talab etadi [2]. Bu izlanish bir-biridan farq qiluvchi aminokislotalarning qay darajada uchrashi va o‘xshash aminokislotalarning o‘zgarmay saqlanib qolishi natijasida virus shtammlarining o‘zaro qay darajada farq qilishini kuzatishimiz mumkin (2-rasm).

MT038049_Plum_pox_virus_strain_D_isolate_Uz3_Uzbekistan	APMFNPIFTPATTQPAIKPVSQVSGPQLQTFGTHGNEDASPSNSNALVNTNRDRDIDAGS	103
OK285056_Plum_pox_virus_strain_T_Turkey	APMFNPIFTPATTQPAIKPISISGATPQSFGVYGNEDASPSNTLVNTGRDRDIDAGS	119
MN734791_Plum_pox_virus_strain_Rec_Russia	TPMFNPIFTPATTQPAIRPVSPISGATPQSFGVYGNEDASPSNTLVNTGRDRDIDAGS	103
MW415808_Plum_pox_virus_strain_M_Turkey	APMFNPIFTPATTQPAVRPVSPISGAKPRSFVYGNEDASPSNTLVNTGRDRDIDAGS	103
HQ670746_Plum_pox_virus_strain_W_Latvia	TSMFNVFTPTATTQPSLKPATSAT-TNPFISFGVGNESVAPSSSNALANLGRDRDIDAGS	103
MG736812_Plum_pox_virus_strain_CR_Russia	TPMFEPIFTPATTQPTIKPVTPSM-TSFFSYGVIGNQNVAPSSSNALANTRKERDIDAGT	103
MW650878_Plum_pox_virus_strain_CV_Russia	PPMFDPIFTPATTQPSVRPIAPT-TSFFSYGVIGNQNVAPSSSNALANTRKERDIDAGS	103
MW650874_Plum_pox_virus_strain_C_Russia	APMFDPIFTPATTQPNVRPIAPVV-TSFFSYGVIGNQNVTPSSSNALVNTNRKERDIDAGT	103
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MT038049_Plum_pox_virus_strain_D_isolate_Uz3_Uzbekistan	IGTFTVPRLKAMTSKLSLPKVGKAIMNLNHLAHYSPAQVDLSNTRAPQSCFQTWYEGVK	163
OK285056_Plum_pox_virus_strain_T_Turkey	IGTFAVPRLKMTSKLSLPKVGKAIMNLNHLAHYSPAQVDLSNTRAPQSCFQTWYEGVK	179
MN734791_Plum_pox_virus_strain_Rec_Russia	IGTFAVPRLKMTSKLSLPKVGKAIMNLNHLAHYSPAQVDLSNTRAPQSCFQTWYEGVK	163
MW415808_Plum_pox_virus_strain_M_Turkey	IGTFAVPRLKMTSKLSLPKVGKAIMNLNHLAHYSPAQVDLSNTRAPQSCFQTWYEGVK	163
HQ670746_Plum_pox_virus_strain_W_Latvia	IGTFTVPRLKAMTSKLSLPKVRGKAIMNLNHLAHYNPAQVDLSNTRAPQSCFQTWYEGVK	163
MG736812_Plum_pox_virus_strain_CR_Russia	VGTFSVPRLKAMTSKLSLPKVRGKAIMNLNHLAHYNPAQVDLSNTRAPQSCFQSWYEGVK	163
MW650878_Plum_pox_virus_strain_CV_Russia	LGTFSVPRLKMTSKLSLPKVGKAIMNLNHLARYNPAQVDLSNTRAPQSCFQTWYEGVK	163
MW650874_Plum_pox_virus_strain_C_Russia	IGTFSVPRLKSMTSKLSLPKVRGKAIMNLNHLAHYNPAQVDLSNTRAPQSCFQTWYEGVK	163
	:***:*****:*****:***:***:***:***:*****:*****	
MT038049_Plum_pox_virus_strain_D_isolate_Uz3_Uzbekistan	RDYDVTDEEMSIILNGLMVVCIENGISPNINGMWVMDGETQVEYPIKPLLDHAKPTFRQ	223
OK285056_Plum_pox_virus_strain_T_Turkey	RDYDVTDEEMSIILNGLMVVCIENGISPNINGMWVMDGETQVEYPIKPLLDHAKPTFRQ	239
MN734791_Plum_pox_virus_strain_Rec_Russia	RDYDVTDEEMSIILNGLMVVCIENGISPNINGMWVMDGETQVEYPIKPLLDHAKPTFRQ	223
MW415808_Plum_pox_virus_strain_M_Turkey	RDYDVTDEEMSIILNGLMVVCIENGISPNINGMWVMDGETQVEYPIKPLLDHAKPTFRQ	223
HQ670746_Plum_pox_virus_strain_W_Latvia	RDYEVTDDEEMSIILNGLMVVCIENGISPNINGMWVMDGETQVEYPIKPLLDHAKPTFRQ	223
MG736812_Plum_pox_virus_strain_CR_Russia	RDYDVSDDEEMSIILNGLMVVCIENGISPNINGMWVMDGETQVEYPIKPLLDHAKPTFRQ	223
MW650878_Plum_pox_virus_strain_CV_Russia	RDYDVSDDEEMSIILNGLMVVCIENGISPNINGMWVMDGETQVEYPIKPLLDHAKPTFRQ	223
MW650874_Plum_pox_virus_strain_C_Russia	RDYDVSDDEEMSIILNGLMVVCIENGISPNINGMWVMDGETQVEYPIKPLLDHAKPTFRQ	223
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MT038049_Plum_pox_virus_strain_D_isolate_Uz3_Uzbekistan	IMAHFSNVAEAYIEKRNYEKAYMPRYGIQRNLTDYSLARYAFDFYEMTSTTPVRAREAHI	283
OK285056_Plum_pox_virus_strain_T_Turkey	IMAHFSNVAEAYIEKRNYEKAYMPRYGIQRNLTDYSLARYAFDFYEMTSTTPVRAREAHI	299
MN734791_Plum_pox_virus_strain_Rec_Russia	IMAHFSNVAEAYIEKRNYEKAYMPRYGIQRNLTDYSLARYAFDFYEMTSTTPVRAREAHI	283
MW415808_Plum_pox_virus_strain_M_Turkey	IMAHFSNVAEAYIEKRNYEKAYMPRYGIQRNLTDYSLARYAFDFYEMTSTTPVRAREAHI	283
HQ670746_Plum_pox_virus_strain_W_Latvia	IMAHFSNVAEAYIEKRNYEKAYMPRYGIQRNLTDYSLARYAFDFYEMTSTTPVRAREAHI	283
MG736812_Plum_pox_virus_strain_CR_Russia	IMAHFSNVAEAYIEKRNYEKAYMPRYGIQRNLTDYSLARYAFDFYEMTSTTPVRAREAHI	283
MW650878_Plum_pox_virus_strain_CV_Russia	IMAHFSNVAEAYIEKRNYEKAYMPRYGIQRNLTDYSLARYAFDFYEMTSTTPVRAREAHI	283
MW650874_Plum_pox_virus_strain_C_Russia	IMAHFSNVAEAYIEKRNYEKAYMPRYGIQRNLTDYSLARYAFDFYEMTSTTPVRAREAHI	283

2-rasm. Olxo‘ri chechagi virusining turli shtammlarining aminokislotalar farqi

Yuqoridagi CP genidagi aminokislotalar tahlili natijasi shuni ko‘rsatdiki, olxo‘ri chechagi virusi shtammlarining aminokislotalari tarkibidagi ketma-ketlik genning dastlabki qismida farq juda ham yuqori ko‘rsatkichni ko‘rsatdi. Genning so‘nggi qismida esa farq uncha ko‘p emasligi va aminokislotalarning

o'xshashligi eng yuqori ekanligi bioinformatik tahlil asosida o'rganildi. Aminokislotalardagi farqlar turli shtammlarda o'zara turli xilda ekanligi har bir shtammning o'ziga xos morfologik va simptomatik belgilarga ega bo'lishini ta'minlab beradi. Yuqoridagi tahlillar esa shtammlarning o'zaro qarindoshligi qay darajada ekanligini o'rganish kerakligini ko'rsatib berdi. Ushbu shtammlarning CP geni asosida filogenetik shajara tuzildi (3-rasm).



3-rasm. Olxo'ri chechagi virusi shtamlarining filogenetik shajarasi

Tahlil MEGA 11 dasturida Statistik metod-Neighbor Joining, Filogenetik test-Bootstrap 1000, Kimura2 modeli, K.Tamura metodi orqali bajarildi. Tahlil natijalariga ko'ra O'zbekistonning MT038049 shtammi Rossiyaning MN734791 va Turkiyaning OK285056, MW415808 shtamlari bilan bir filogenetik shoxda joylashganligini hamda yaqin qarindoshlikni ko'rsatdi. Undan tashqari Rossiyaning MW650878, MW650874, MG736812 shtamlari va Latviyaning HQ670746 shtamlari esa uzoq qarindoshlikni ko'rsatdi.

Xulosa: OChV patogeni va u keltirib chiqaradigan kasallik to'g'risida har bir inson o'rganishi hattoki imkoniyati cheklangan insonlarga ham bu haqida ma'lumot berish zarur [3]. Virus haqida to'liqroq ma'lumotga ega bo'lish uchun turli molekulusullar va tahlil natijalarini bilish kerak. Bu kasallikni oldini olish insonlarning bu patogen haqida tushunchaga ega bo'lishi juda muhim.

Adabiyotlar:

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