

Supplementary Table S1. Full genomic annotations of 10 Duhok isolates from the third wave of the SARS-CoV-2 pandemic

Genomic region	Nucleotide variation	AA change	Isolates	Exonic Function	Mutation per region	% of total mutations
5'UTR	G210T	NA	all 10 samples	Upstream	3	2.941176471
5'UTR	C241T	NA	all 10 samples	Upstream		
5'UTR	G242T	NA	6	Upstream		
ORF1a;ORF1ab;nsp1	NA	NA	NA	NA	0	0
ORF1a;ORF1ab;nsp2	C2062T	A419A	4	synonymous SNV	2	1.960784314
ORF1a;ORF1ab;nsp2	C2094T	S430L	1	nonsynonymous SNV		
ORF1a;ORF1ab;nsp3	C3037T	F106F	all 10 samples	synonymous SNV	17	16.66666667
ORF1a;ORF1ab;nsp3	C3096T	S126L	5	nonsynonymous SNV		
ORF1a;ORF1ab;nsp3	C3099A	T127N	7	nonsynonymous SNV		
ORF1a;ORF1ab;nsp3	G3320A	V201I	3	nonsynonymous SNV		
ORF1a;ORF1ab;nsp3	G4181T	A488S	1,2,3,4,5,6,7,10	nonsynonymous SNV		
ORF1a;ORF1ab;nsp3	C4575T	T619I	3	nonsynonymous SNV		
ORF1a;ORF1ab;nsp3	T4888C	P723P	8,9	synonymous SNV		
ORF1a;ORF1ab;nsp3	G5062A	L781L	6	synonymous SNV		
ORF1a;ORF1ab;nsp3	C5184T	P822L	8,9	nonsynonymous SNV		
ORF1a;ORF1ab;nsp3	A5462C	S915R	2,5	nonsynonymous SNV		
ORF1a;ORF1ab;nsp3	A5584G	T955T	8,9	synonymous SNV		
ORF1a;ORF1ab;nsp3	T5653C	Y978Y	6	synonymous SNV		
ORF1a;ORF1ab;nsp3	C6402T	P1228L	1,2,3,4,5,6,7,10	nonsynonymous SNV		
ORF1a;ORF1ab;nsp3	C7124T	P1469S	1,2,3,4,5,6,7,10	nonsynonymous SNV		
ORF1a;ORF1ab;nsp3	T7657G	F1646L	9	nonsynonymous SNV		
ORF1a;ORF1ab;nsp3	A7886G	I1723V	8,9	nonsynonymous SNV		
ORF1a;ORF1ab;nsp3	C7955T	L1746F	3	nonsynonymous SNV		
ORF1a;ORF1ab;nsp4	T8737C	D61D	2,3,5,7	synonymous SNV	7	6.862745098
ORF1a;ORF1ab;nsp4	C8986T	D144D	1,2,3,4,5,6,7,10	synonymous SNV		
ORF1a;ORF1ab;nsp4	G9053T	V167L	1,2,3,4,5,6,7,10	nonsynonymous SNV		
ORF1a;ORF1ab;nsp4	C9474T	A307V	1	nonsynonymous SNV		
ORF1a;ORF1ab;nsp4	C9857T	L435L	8,9	synonymous SNV		
ORF1a;ORF1ab;nsp4	C9891T	A446V	8,9	nonsynonymous SNV		
ORF1a;ORF1ab;nsp4	C10029T	T492I	1,2,3,4,5,6,7,10	nonsynonymous SNV		
ORF1a;ORF1ab;nsp5	C10232T	R60C	10	nonsynonymous SNV	2	1.960784314

ORF1a;ORF1ab;nsp5	C10279T	L75L	5	synonymous SNV		
ORF1a;ORF1ab;nsp6	A11201G	T77A	1,2,3,4,5,6,7,10	nonsynonymous SNV	5	4.901960784
ORF1a;ORF1ab;nsp6	A11332G	V120V	1,2,3,4,5,6,7,10	synonymous SNV		
ORF1a;ORF1ab;nsp6	T11418C	V149A	8,9	nonsynonymous SNV		
ORF1a;ORF1ab;nsp6	C11514T	T181I	8,9	nonsynonymous SNV		
ORF1a;ORF1ab;nsp6	C11671T	R233R	8,9	synonymous SNV		
ORF1a;ORF1ab;nsp7	NA					
ORF1a;ORF1ab;nsp8	C12676T	V195V	7	synonymous SNV	1	0.980392157
ORF1a;ORF1ab;nsp9	C13019T	L112L	8,9	synonymous SNV	1	0.980392157
ORF1a;ORF1ab;nsp10	C13168T	H48H	10	synonymous SNV	1	0.980392157
ORF1ab;nsp12	A13620G	D60D	10	synonymous SNV	10	9.803921569
ORF1ab;nsp12	A13748G	K103R	1,4,6	nonsynonymous SNV		
ORF1ab;nsp12	G14118T	T226T	4	synonymous SNV		
ORF1ab;nsp12	A14246G	D269G	8,9	nonsynonymous SNV		
ORF1ab;nsp12	C14407T	P323S	10	nonsynonymous SNV		
ORF1ab;nsp12	C14408T	P323L	all 10 samples	nonsynonymous SNV		
ORF1ab;nsp12	C14599T	L387L	4	synonymous SNV		
ORF1ab;nsp12	T14769C	A443A	2	synonymous SNV		
ORF1ab;nsp12	C14805T	Y455Y	2,3,5,7	synonymous SNV		
ORF1ab;nsp12	G15451A	G671S	all 10 samples	nonsynonymous SNV		
ORF1ab;nsp13	C16466T	P5401L	all 10 samples	nonsynonymous SNV	2	1.960784314
ORF1ab;nsp13	C16726T	H5488Y	4	nonsynonymous SNV		
ORF1ab;nsp14	A19008C	A6248A	8,9	synonymous SNV	2	1.960784314
ORF1ab;nsp14	C19220T	A6319V	1,2,3,4,5,6,7,10	nonsynonymous SNV		
ORF1ab;nsp15	G20464T	D6734Y	7	nonsynonymous SNV	1	0.980392157
ORF1ab;nsp16	G20808A	L6848L	6	synonymous SNV	2	1.960784314
ORF1ab;nsp16	G21255C	A6997A	1,4,6	synonymous SNV		
S	o	T19R	all 10 samples	nonsynonymous SNV	22	21.56862745
S	C21622T	T20T	10	synonymous SNV		
S	A21647G	T29A	2,3,5,7	nonsynonymous SNV		
S	C21721T	D53D	1,4,6	synonymous SNV		
S	G21800T	D80Y	4	nonsynonymous SNV		
S	C21811T	V83V	3	synonymous SNV		
S	C21846T	T95I	1,4,6,19	nonsynonymous SNV		
S	G21987A	G142D	all 10 samples	nonsynonymous SNV		
S	G22021T	M153I	10	nonsynonymous SNV		
S	AGTTCA22029.	156_158del	all 10 samples	nonframeshift deletion		
S	C22227T	A222V	8,9	nonsynonymous SNV		

S	C22264T	N234N	5	synonymous SNV		
S	C22311T	T250I	2,3,5,7	nonsynonymous SNV		
S	C22858T	C432C	3	synonymous SNV		
S	T22917G	L452R	all 10 samples	nonsynonymous SNV		
S	C22995A	T478K	all 10 samples	nonsynonymous SNV		
S	A23403G	D614G	all 10 samples	nonsynonymous SNV		
S	C23557T	P665P	10	synonymous SNV		
S	C23604G	P681R	all 10 samples	nonsynonymous SNV		
S	A23848G	Q762Q	8,9	synonymous SNV		
S	G24410A	D950N	all 10 samples	nonsynonymous SNV		
S	C25047T	P1162L	2	nonsynonymous SNV		
ORF3a	C25469T	S26L	all 10 samples	nonsynonymous SNV	4	3.921568627
ORF3a	C25584T	T64T	2,3,5,7	synonymous SNV		
ORF3a	C25667T	S92L	4	nonsynonymous SNV		
ORF3a	G25996T	V202L	10	nonsynonymous SNV		
M	C26684G	L54L	7	synonymous SNV	2	1.960784314
M	T26767C	I82T	all 10 samples	nonsynonymous SNV		
ORF6	C27371T	P57L	8,9	nonsynonymous SNV	1	0.980392157
ORF7a	G27461T	C23F	10	nonsynonymous SNV	4	3.921568627
ORF7a	C27476T	T28I	10	nonsynonymous SNV		
ORF7a	T27638C	V82A	all 10 samples	nonsynonymous SNV		
ORF7a	C27752T	T120I	all 10 samples	nonsynonymous SNV		
ORF7b	C27874T	T40I	1,2,3,4,5,6,7,10	nonsynonymous SNV	1	0.980392157
ORF8	GATTTC28248.	119_120del	all 10 samples	nonframeshift deletion	1	0.980392157
N	A28461G	D63G	all 10 samples	nonsynonymous SNV	7	6.862745098
N	C28677T	T135I	10	nonsynonymous SNV		
N	G28881T	R203M	all 10 samples	nonsynonymous SNV		
N	G28916T	G215C	1,2,3,4,5,6,7,10	nonsynonymous SNV		
N	G28936T	L221F	7	nonsynonymous SNV		
N	C29284T	I337I	2	synonymous SNV		
N	G29402T	D377Y	all 10 samples	nonsynonymous SNV		
ORF10	A29567G	I4V	4	nonsynonymous SNV	1	0.980392157
3'UTR	A29706G	NA	3	Downstream	3	2.941176471
3'UTR	G29742T	NA	all 10 samples	Downstream		
3'UTR	A29767C	NA	3	Downstream		

Total		102	
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UTR: Un-translated region

NA: Not available

SNV: Single nucleotide variation

AA: Amino acids

Supplementary Table S2. Full genomic annotations of 2 Duhok isolates from the fifth wave of the SARS-CoV-2 pandemic

Genomic region	Nucleotide variation	AA change	Isolates	Exonic Function	Mutation per region	% of tatotal muattions
5'UTR	C44T	.		upstream	2	2.5
5'UTR	C241T	.		upstream		
ORF1a;ORF1ab;nsp1	C313T	L16L	exonic	synonymous SNV	2	2.5
ORF1a;ORF1ab;nsp1	T670G	S135R	exonic	nonsynonymous SNV		
ORF1a;ORF1ab;nsp2	C1627T	L274L	exonic	synonymous SNV	1	1.25
ORF1a;ORF1ab;nsp3	C2790T	T24I	exonic	nonsynonymous SNV	4	5
ORF1a;ORF1ab;nsp3	C3037T	F106F	exonic	synonymous SNV		
ORF1a;ORF1ab;nsp3	G4184A	G489S	exonic	nonsynonymous SNV		
ORF1a;ORF1ab;nsp3	C4321T	A534A	exonic	synonymous SNV		
ORF1a;ORF1ab;nsp4	C9344T	L264F	exonic	nonsynonymous SNV	5	6.25
ORF1a;ORF1ab;nsp4	A9424G	V290V	exonic	synonymous SNV		
ORF1a;ORF1ab;nsp4	C9534T	T327I	exonic	nonsynonymous SNV		
ORF1a;ORF1ab;nsp4	T9574C	G340G	exonic	synonymous SNV		
ORF1a;ORF1ab;nsp4	C10029T	T492I	exonic	nonsynonymous SNV		
ORF1a;ORF1ab;nsp5	C10198T	D48D	exonic	synonymous SNV	3	3.75
ORF1a;ORF1ab;nsp5	G10447A	R131R	exonic	synonymous SNV		
ORF1a;ORF1ab;nsp5	C10449A	P132H	exonic	nonsynonymous SNV		
ORF1a;ORF1ab;nsp6	TCTGGTTTT	106_108del	exonic	nonframeshift deletion	2	2.5
ORF1a;ORF1ab;nsp6	C11396	L142F	exonic	nonsynonymous SNV		
ORF1a;ORF1ab;nsp8	G12160A	E23E	exonic	synonymous SNV	2	2.5
ORF1a;ORF1ab;nsp8	G12310A	Q73Q	exonic	synonymous SNV		
ORF1a;ORF1ab;nsp9	C12880T	I65I	exonic	synonymous SNV	1	1.25
ORF1ab;nsp12	C14408T	P323L	exonic	nonsynonymous SNV	2	2.5
ORF1ab;nsp12	C15714T	L758L	exonic	synonymous SNV		
ORF1ab;nsp13	C16616A	T5451N	exonic	nonsynonymous SNV	2	2.5
ORF1ab;nsp13	C17410T	R5716C	exonic	nonsynonymous SNV		
ORF1ab;nsp14	A18163G	I5967V	exonic	nonsynonymous SNV	1	1.25
ORF1ab;nsp15	C19955T	T6564I	exonic	nonsynonymous SNV	2	2.5
ORF1ab;nsp15	A20055G	E6597E	exonic	synonymous SNV		
S	C21618T	T19I	exonic	nonsynonymous SNV	32	39.02439024
S	TACCCCCTG	24_27del	exonic	nonframeshift deletion		
S	TACATG	68_70del	exonic	nonframeshift deletion		
S	G21987A	G142D	exonic	nonsynonymous		

				SNV		
S	T22200G	V213G	exonic	nonsynonymous SNV		
S	G22578A	G339D	exonic	nonsynonymous SNV		
S	C22674T	S371F	exonic	nonsynonymous SNV		
S	T22679C	S373P	exonic	nonsynonymous SNV		
S	C22686T	S375F	exonic	nonsynonymous SNV		
S	A22688G	T376A	exonic	nonsynonymous SNV		
S	G22775A	D405N	exonic	nonsynonymous SNV		
S	A22786C	R408S	exonic	nonsynonymous SNV		
S	G22813T	K417N	exonic	nonsynonymous SNV		
S	T22882G	N440K	exonic	nonsynonymous SNV		
S	T22917G	L452R	exonic	nonsynonymous SNV		
S	G22992A	S477N	exonic	nonsynonymous SNV		
S	C22995A	T478K	exonic	nonsynonymous SNV		
S	A23013C	E484A	exonic	nonsynonymous SNV		
S	T23018G	F486V	exonic	nonsynonymous SNV		
S	T23042C	S494P	exonic	nonsynonymous SNV		
S	A23055G	Q498R	exonic	nonsynonymous SNV		
S	A23063T	N501Y	exonic	nonsynonymous SNV		
S	T23075C	Y505H	exonic	nonsynonymous SNV		
S	A23403G	D614G	exonic	nonsynonymous SNV		
S	C23525T	H655Y	exonic	nonsynonymous SNV		
S	T23599G	N679K	exonic	nonsynonymous SNV		
S	C23604A	P681H	exonic	nonsynonymous SNV		
S	C23854A	N764K	exonic	nonsynonymous SNV		
S	G23948T	D796Y	exonic	nonsynonymous SNV		
S	A24424T	Q954H	exonic	nonsynonymous SNV		
S	T24469A	N969K	exonic	nonsynonymous SNV		
S	C2500T	D1146D	exonic	synonymous SNV		
ORF3a	C25584T	T64T	exonic	synonymous SNV	4	5
ORF3a	C25896T	V168V	exonic	synonymous SNV		

ORF3a	C26060T	T223I	exonic	nonsynonymous SNV		
ORF3a	G26109T	E239D	exonic	nonsynonymous SNV		
E	C26270T	T9I	exonic	nonsynonymous SNV	1	1.25
M	G26529A	D3N	exonic	nonsynonymous SNV	4	5
M	C26577G	Q19E	exonic	nonsynonymous SNV		
M	G26709A	A63T	exonic	nonsynonymous SNV		
M	C27012T	L164L	exonic	synonymous SNV		
ORF7a	C27513T	Y40Y	exonic	synonymous SNV	2	2.5
ORF7b	C27807T	L18L	exonic	synonymous SNV		
N	C28311T	P13L	exonic	nonsynonymous SNV	7	8.75
N	A28330G	G19G	exonic	synonymous SNV		
N	GAGAACGCA	30_33del	exonic	nonframeshift deletion		
N	G28881A	R203K	exonic	nonsynonymous SNV		
N	G28882A	R203R	exonic	synonymous SNV		
N	G28883C	G204R	exonic	nonsynonymous SNV		
N	A29510C	S413R	exonic	nonsynonymous SNV		
N;ORF10	GAGGCCACGCGGAGTACGATCGAGTG	.		downstream	1	1.25
					80	

UTR: Un-translated region

NA: Not available

SNV: Single nucleotide variation

AA: Amino acids