

UGene – Open-Source Cross  
Platform Bioinformatics  
Software

# Introduction

- UGene allows interactive visualization and manipulation of common bioinformatics file formats
- Reference: <https://academic.oup.com/bioinformatics/article/28/8/1166/195474>
- User manual: [http://ugene.net/downloads/UniproUGENE\\_UserManual.pdf](http://ugene.net/downloads/UniproUGENE_UserManual.pdf)
- Download link: <http://ugene.net/download.html>

# Home Screen

UGENE

Start Page

Welcome to UGENE

Open File(s)

Create Sequence

Run or Create Workflow

Quick Start Guide

Recent files

- sample\_muscle.txt
- msa\_2020-04-28.fasta
- genomes\_aligned\_v3.fasta
- YP\_009725296.1\_ORF7b\_peptide.fasta
- YP\_009725295.1\_orf1a\_polyprotein\_peptide.f...
- YP\_009725255.1\_ORF10\_protein\_peptide.fasta
- YP\_009724397.2\_nucleocapsid\_phosphoprot...

Recent projects

No opened projects

Cite UGENE:

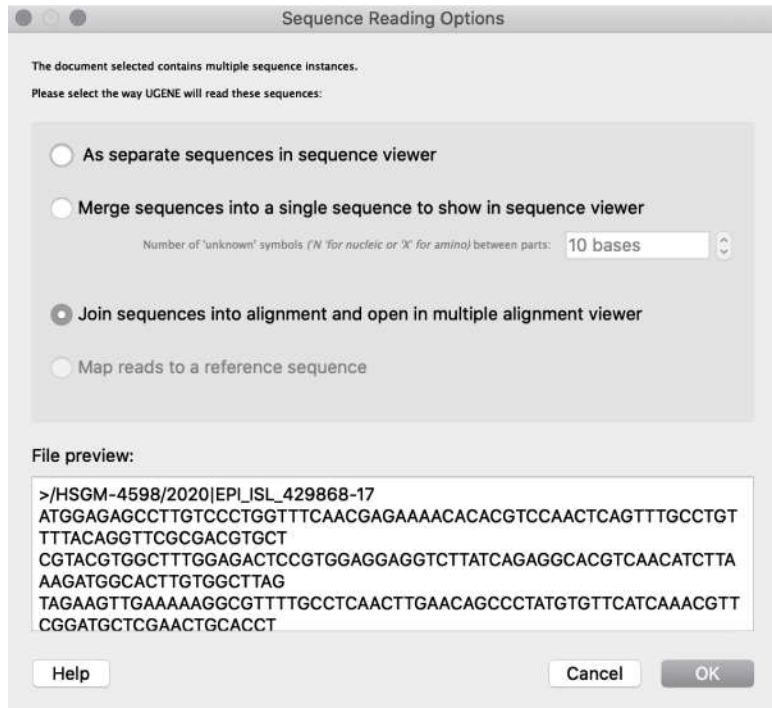
"Unipro UGENE: a unified bioinformatics toolkit"  
Okonechnikov, Golosova, Fursov; the UGENE team  
Bioinformatics 2012 28: 1166-1167

Follow UGENE:

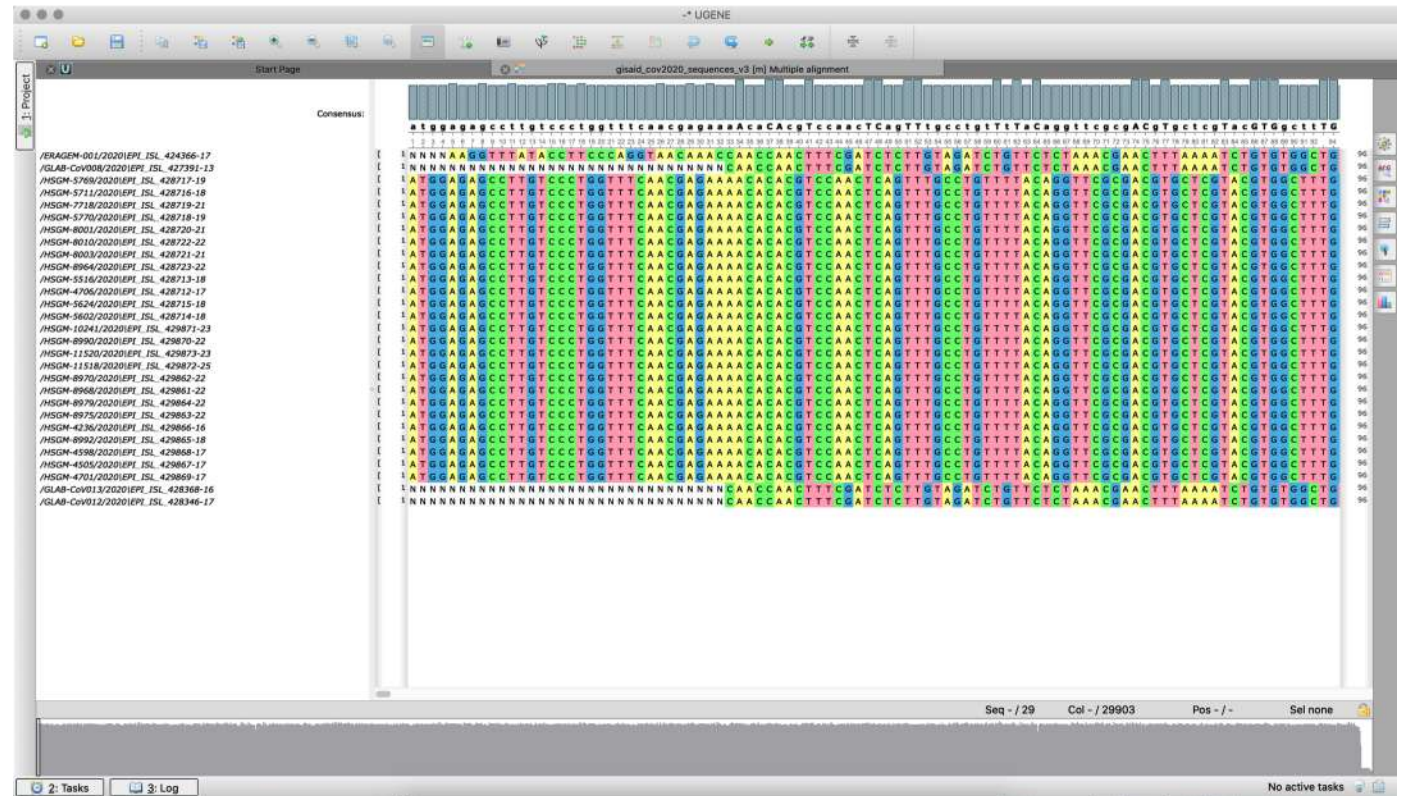
2: Tasks | 3: Log

No active tasks

# Multiple Sequence Alignment View

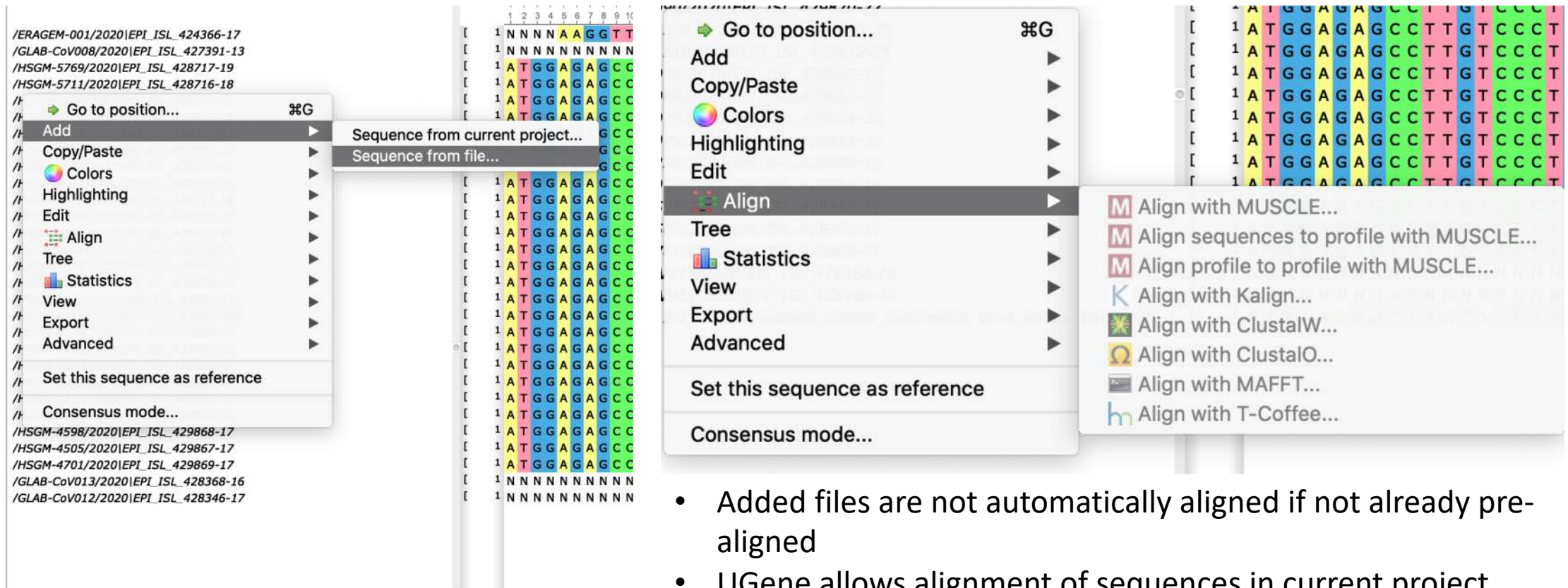


- Shows up when opening FASTA file with multiple sequences for the first time



- Multiple alignment viewer image of aligned sequences

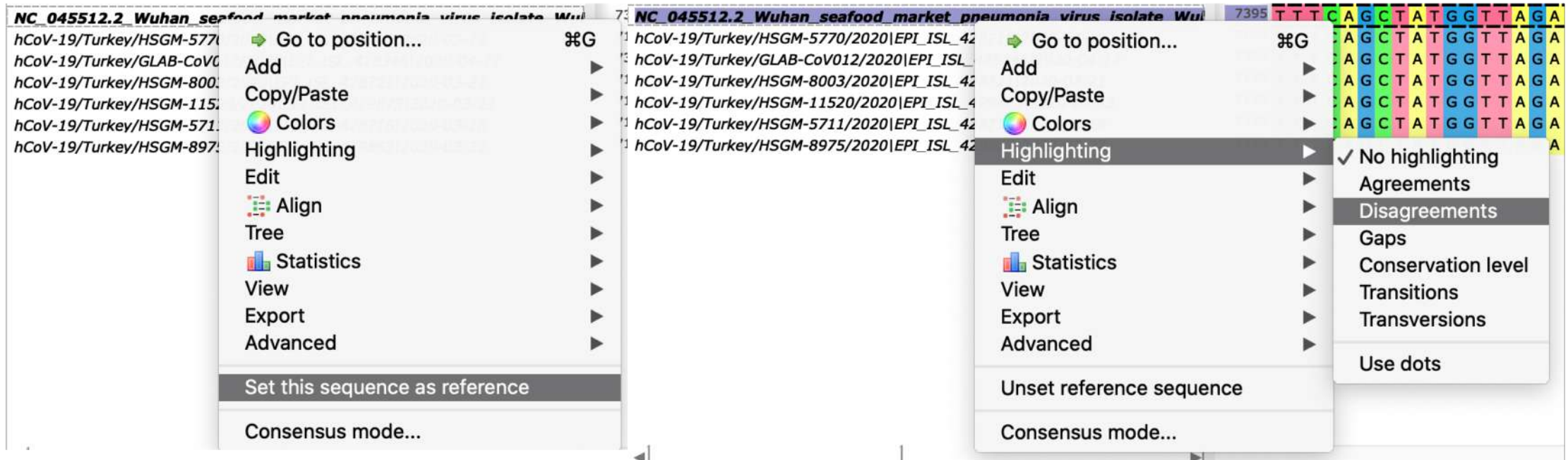
# Adding New Files To View



- Files can be added from the right click menu

- Added files are not automatically aligned if not already pre-aligned
- UGene allows alignment of sequences in current project using one of multiple algorithms
- WARNING: alignment of large sequences takes prohibitively long time on slower machines

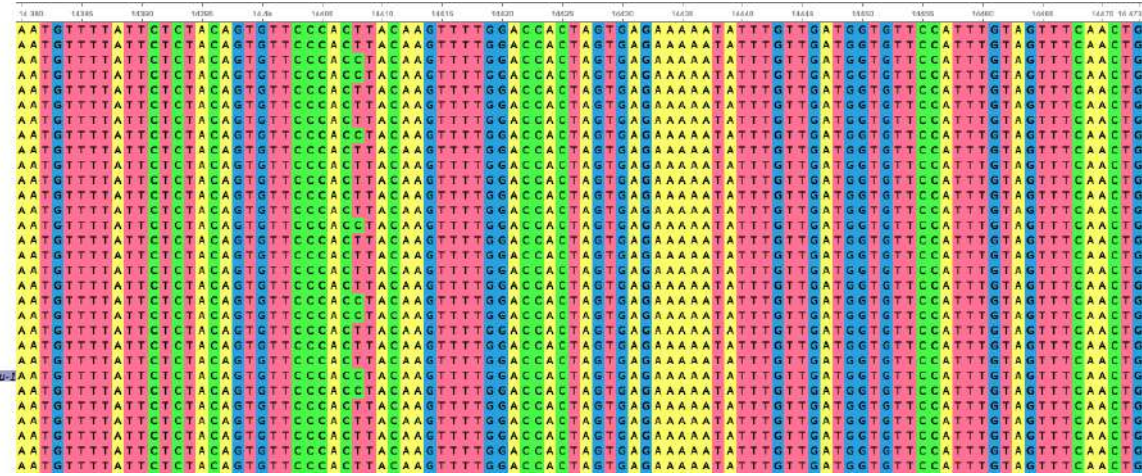
# Highlighting Options



- A selected sequence in an alignment can be set as reference
- Sites in other sequences that are identical to or different from reference can be highlighted, as well as specific mutation types, gaps or conservation level

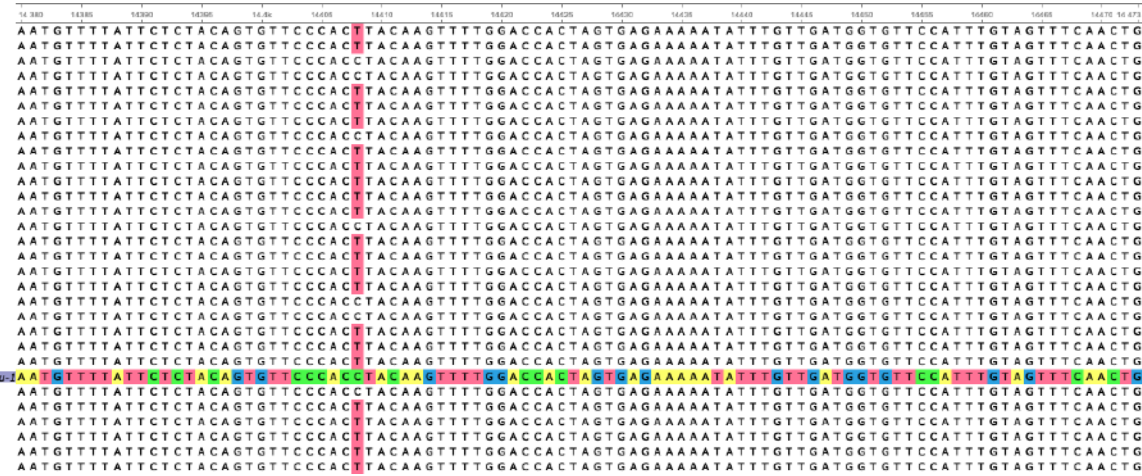
# No highlight

*hCoV-19/Turkey/HSGM-8954/2020|EPI\_ISL\_426723|2020-03-22*  
*hCoV-19/Turkey/GLAB-CoV013/2020|EPI\_ISL\_428358|2020-04-16*  
*hCoV-19/Turkey/HSGM-8992/2020|EPI\_ISL\_429855|2020-03-18*  
*hCoV-19/Turkey/HSGM-5516/2020|EPI\_ISL\_426713|2020-03-18*  
*hCoV-19/Turkey/HSGM-5769/2020|EPI\_ISL\_426717|2020-03-19*  
*hCoV-19/Turkey/HSGM-7718/2020|EPI\_ISL\_426719|2020-03-21*  
*hCoV-19/Turkey/HSGM-4706/2020|EPI\_ISL\_426712|2020-03-17*  
*hCoV-19/Turkey/IRAGEM-001/2020|EPI\_ISL\_424366|2020-03-17*  
*hCoV-19/Turkey/HSGM-10241/2020|EPI\_ISL\_429871|2020-03-23*  
*hCoV-19/Turkey/HSGM-5602/2020|EPI\_ISL\_426714|2020-03-18*  
*hCoV-19/Turkey/HSGM-8001/2020|EPI\_ISL\_426720|2020-03-21*  
*hCoV-19/Turkey/HSGM-5634/2020|EPI\_ISL\_426715|2020-03-18*  
*hCoV-19/Turkey/HSGM-8968/2020|EPI\_ISL\_429861|2020-03-22*  
*hCoV-19/Turkey/HSGM-9010/2020|EPI\_ISL\_426722|2020-03-22*  
*hCoV-19/Turkey/GLAB-CoV008/2020|EPI\_ISL\_427391|2020-04-13*  
*hCoV-19/Turkey/HSGM-4505/2020|EPI\_ISL\_429867|2020-03-17*  
*hCoV-19/Turkey/HSGM-4236/2020|EPI\_ISL\_429866|2020-03-16*  
*hCoV-19/Turkey/HSGM-4701/2020|EPI\_ISL\_429869|2020-03-17*  
*hCoV-19/Turkey/HSGM-11518/2020|EPI\_ISL\_429872|2020-03-23*  
*hCoV-19/Turkey/HSGM-4598/2020|EPI\_ISL\_429868|2020-03-17*  
*hCoV-19/Turkey/HSGM-8990/2020|EPI\_ISL\_429870|2020-03-22*  
*hCoV-19/Turkey/HSGM-8979/2020|EPI\_ISL\_429864|2020-03-22*  
*hCoV-19/Turkey/HSGM-8970/2020|EPI\_ISL\_429862|2020-03-22*  
**NC\_045512.2\_Wuhan\_seafood\_market\_pneumonia\_virus\_isolate\_Wuhan-Hu-**  
*hCoV-19/Turkey/HSGM-5770/2020|EPI\_ISL\_426716|2020-03-19*  
*hCoV-19/Turkey/GLAB-CoV012/2020|EPI\_ISL\_428346|2020-04-17*  
*hCoV-19/Turkey/HSGM-9003/2020|EPI\_ISL\_426721|2020-03-21*  
*hCoV-19/Turkey/HSGM-11520/2020|EPI\_ISL\_429873|2020-03-23*  
*hCoV-19/Turkey/HSGM-5711/2020|EPI\_ISL\_426716|2020-03-18*  
*hCoV-19/Turkey/HSGM-8975/2020|EPI\_ISL\_429863|2020-03-22*

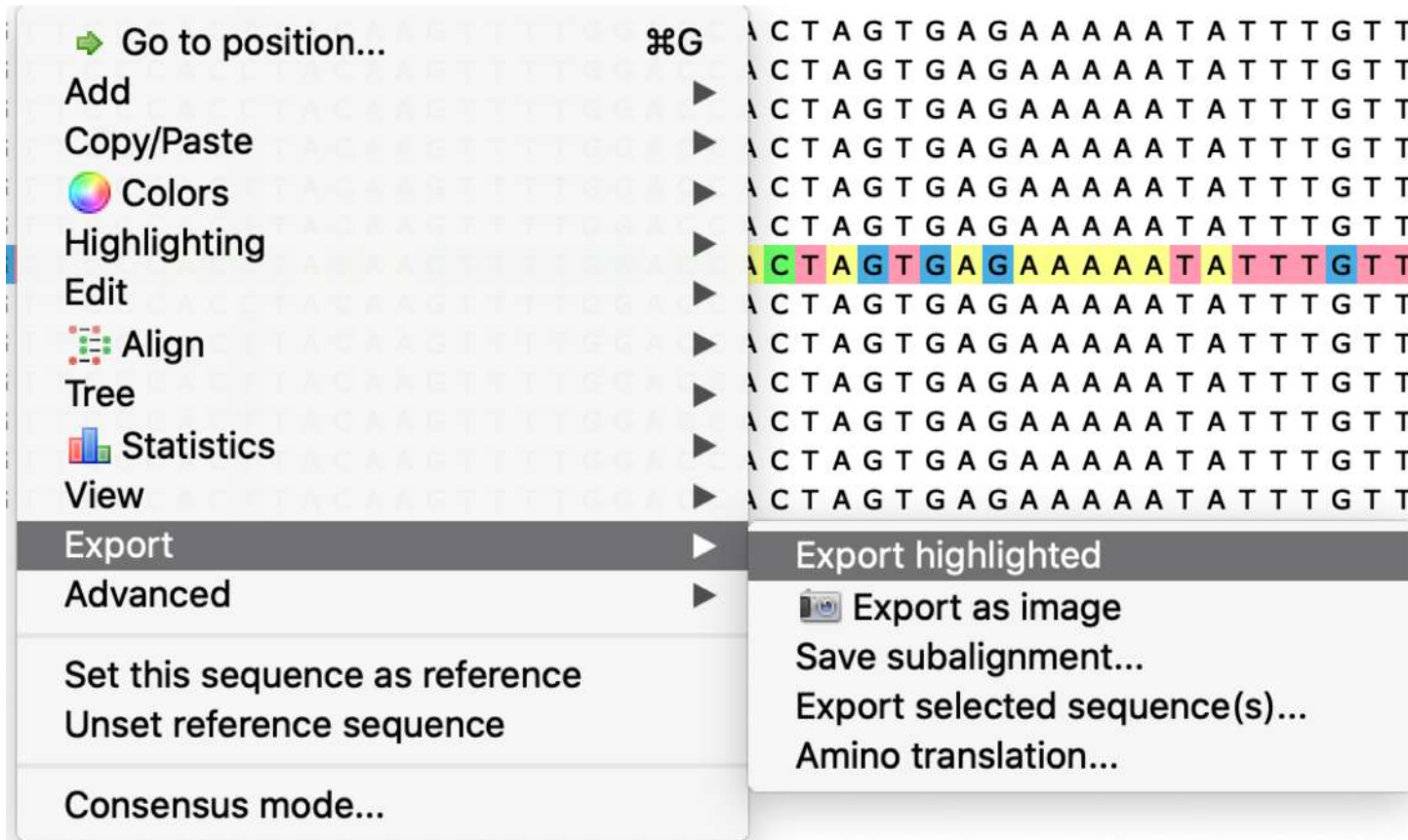


# Highlighted disagreements

*hCoV-19/Turkey/HSGM-8954/2020|EPI\_ISL\_426723|2020-03-22*  
*hCoV-19/Turkey/GLAB-CoV013/2020|EPI\_ISL\_428358|2020-04-16*  
*hCoV-19/Turkey/HSGM-8992/2020|EPI\_ISL\_429855|2020-03-18*  
*hCoV-19/Turkey/HSGM-5516/2020|EPI\_ISL\_426713|2020-03-18*  
*hCoV-19/Turkey/HSGM-5769/2020|EPI\_ISL\_426717|2020-03-19*  
*hCoV-19/Turkey/HSGM-7718/2020|EPI\_ISL\_426719|2020-03-21*  
*hCoV-19/Turkey/HSGM-4706/2020|EPI\_ISL\_426712|2020-03-17*  
*hCoV-19/Turkey/IRAGEM-001/2020|EPI\_ISL\_424366|2020-03-17*  
*hCoV-19/Turkey/HSGM-10241/2020|EPI\_ISL\_429871|2020-03-23*  
*hCoV-19/Turkey/HSGM-5602/2020|EPI\_ISL\_426714|2020-03-18*  
*hCoV-19/Turkey/HSGM-8001/2020|EPI\_ISL\_426720|2020-03-21*  
*hCoV-19/Turkey/HSGM-5634/2020|EPI\_ISL\_426715|2020-03-18*  
*hCoV-19/Turkey/HSGM-8968/2020|EPI\_ISL\_429861|2020-03-22*  
*hCoV-19/Turkey/HSGM-9010/2020|EPI\_ISL\_426722|2020-03-22*  
*hCoV-19/Turkey/GLAB-CoV008/2020|EPI\_ISL\_427391|2020-04-13*  
*hCoV-19/Turkey/HSGM-4505/2020|EPI\_ISL\_429867|2020-03-17*  
*hCoV-19/Turkey/HSGM-4236/2020|EPI\_ISL\_429866|2020-03-16*  
*hCoV-19/Turkey/HSGM-4701/2020|EPI\_ISL\_429869|2020-03-17*  
*hCoV-19/Turkey/HSGM-11518/2020|EPI\_ISL\_429872|2020-03-23*  
*hCoV-19/Turkey/HSGM-4598/2020|EPI\_ISL\_429868|2020-03-17*  
*hCoV-19/Turkey/HSGM-8990/2020|EPI\_ISL\_429870|2020-03-22*  
*hCoV-19/Turkey/HSGM-8979/2020|EPI\_ISL\_429864|2020-03-22*  
*hCoV-19/Turkey/HSGM-8970/2020|EPI\_ISL\_429862|2020-03-22*  
**NC\_045512.2\_Wuhan\_seafood\_market\_pneumonia\_virus\_isolate\_Wuhan-Hu-**  
*hCoV-19/Turkey/HSGM-5770/2020|EPI\_ISL\_426716|2020-03-19*  
*hCoV-19/Turkey/GLAB-CoV012/2020|EPI\_ISL\_428346|2020-04-17*  
*hCoV-19/Turkey/HSGM-9003/2020|EPI\_ISL\_426721|2020-03-21*  
*hCoV-19/Turkey/HSGM-11520/2020|EPI\_ISL\_429873|2020-03-23*  
*hCoV-19/Turkey/HSGM-5711/2020|EPI\_ISL\_426716|2020-03-18*  
*hCoV-19/Turkey/HSGM-8975/2020|EPI\_ISL\_429863|2020-03-22*



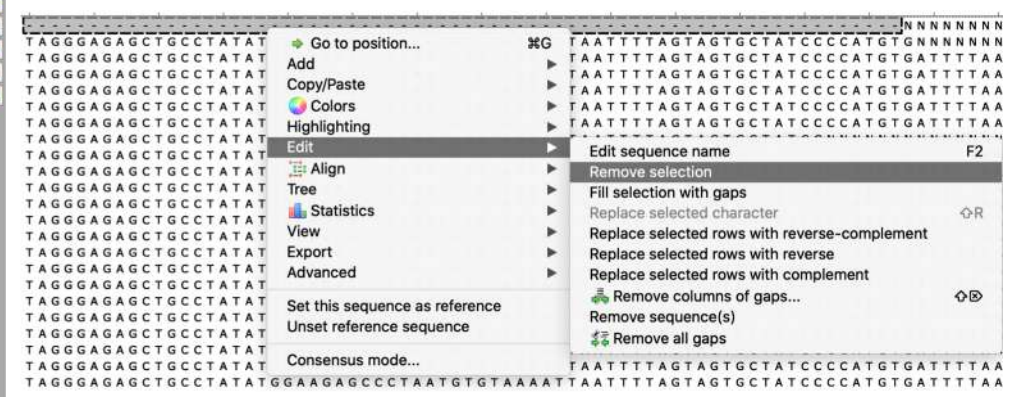
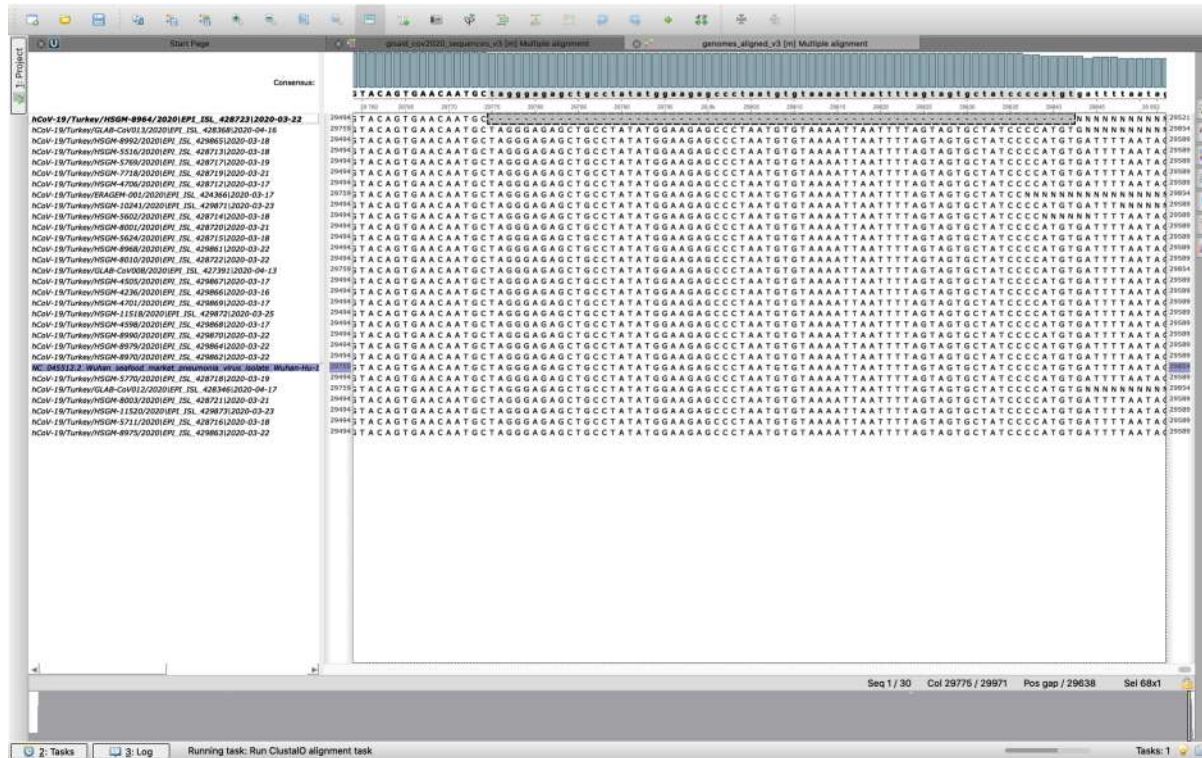
# Extracting Highlighted Sequences



- The highlighted sites can be exported in tab-delimited text file
- The resulting file can be viewed in Microsoft Excel, Pages, or similar software
- The first column shows nucleotide position, the second column shows reference sequence, the remaining columns show non-aligned sites
- Gaps are shown with -, while sites identical to reference are shown with .



# Manually Editing Sequences

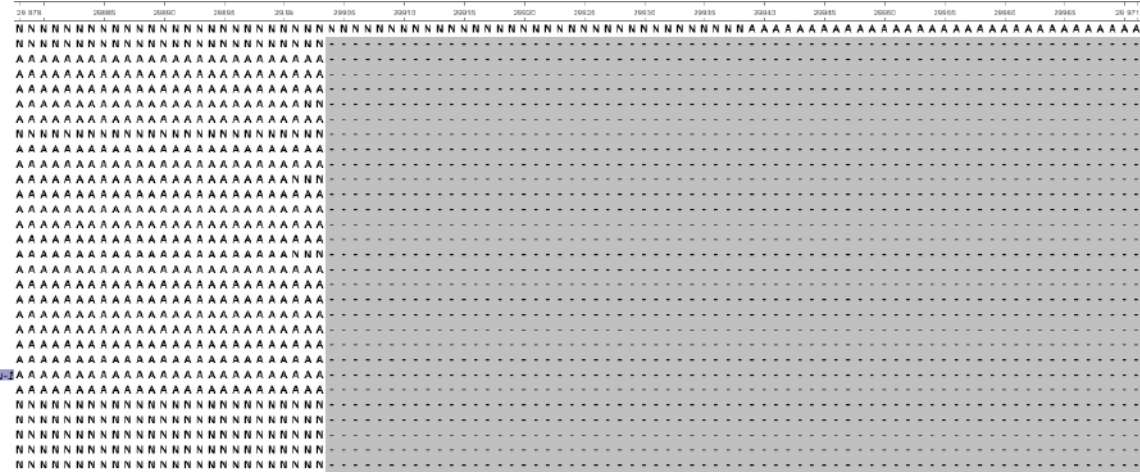


- Low quality sequences can cause misalignment as unidentified residues (N in nucleotide, X in peptide) align preferentially with each other

- Sequences can be edited manually using the right click menu
- Individual sites or long stretches can be edited

# Erroneous gaps

*hCoV-19/Turkey/HSGM-8954/2020|EPI\_ISL\_426723|2020-03-22*  
*hCoV-19/Turkey/GLAB-CoV013/2020|EPI\_ISL\_428368|2020-04-16*  
*hCoV-19/Turkey/HSGM-8992/2020|EPI\_ISL\_429855|2020-03-18*  
*hCoV-19/Turkey/HSGM-5516/2020|EPI\_ISL\_426713|2020-03-18*  
*hCoV-19/Turkey/HSGM-5769/2020|EPI\_ISL\_426717|2020-03-19*  
*hCoV-19/Turkey/HSGM-7718/2020|EPI\_ISL\_426719|2020-03-21*  
*hCoV-19/Turkey/HSGM-4706/2020|EPI\_ISL\_426712|2020-03-17*  
*hCoV-19/Turkey/ERAGEM-001/2020|EPI\_ISL\_424366|2020-03-17*  
*hCoV-19/Turkey/HSGM-10241/2020|EPI\_ISL\_429871|2020-03-23*  
*hCoV-19/Turkey/HSGM-5602/2020|EPI\_ISL\_426714|2020-03-18*  
*hCoV-19/Turkey/HSGM-8001/2020|EPI\_ISL\_426720|2020-03-21*  
*hCoV-19/Turkey/HSGM-5624/2020|EPI\_ISL\_426715|2020-03-18*  
*hCoV-19/Turkey/HSGM-8968/2020|EPI\_ISL\_429851|2020-03-22*  
*hCoV-19/Turkey/HSGM-8010/2020|EPI\_ISL\_426722|2020-03-22*  
*hCoV-19/Turkey/GLAB-CoV008/2020|EPI\_ISL\_427391|2020-04-13*  
*hCoV-19/Turkey/HSGM-4505/2020|EPI\_ISL\_429857|2020-03-17*  
*hCoV-19/Turkey/HSGM-4236/2020|EPI\_ISL\_429856|2020-03-16*  
*hCoV-19/Turkey/HSGM-4701/2020|EPI\_ISL\_429859|2020-03-17*  
*hCoV-19/Turkey/HSGM-11518/2020|EPI\_ISL\_429872|2020-03-25*  
*hCoV-19/Turkey/HSGM-4598/2020|EPI\_ISL\_429868|2020-03-17*  
*hCoV-19/Turkey/HSGM-8990/2020|EPI\_ISL\_429870|2020-03-22*  
*hCoV-19/Turkey/HSGM-8979/2020|EPI\_ISL\_429854|2020-03-22*  
*hCoV-19/Turkey/HSGM-8970/2020|EPI\_ISL\_429852|2020-03-22*  
**NC\_045512.2\_Wuhan\_seafood\_market\_pneumonia\_virus\_isolate\_Wuhan-Hu-1**  
*hCoV-19/Turkey/HSGM-5770/2020|EPI\_ISL\_426718|2020-03-19*  
*hCoV-19/Turkey/GLAB-CoV012/2020|EPI\_ISL\_428346|2020-04-17*  
*hCoV-19/Turkey/HSGM-8003/2020|EPI\_ISL\_426721|2020-03-21*  
*hCoV-19/Turkey/HSGM-11520/2020|EPI\_ISL\_429873|2020-03-23*  
*hCoV-19/Turkey/HSGM-5711/2020|EPI\_ISL\_426716|2020-03-18*  
*hCoV-19/Turkey/HSGM-8975/2020|EPI\_ISL\_429853|2020-03-22*



# Gaps removed

*hCoV-19/Turkey/HSGM-8954/2020|EPI\_ISL\_426723|2020-03-22*  
*hCoV-19/Turkey/GLAB-CoV013/2020|EPI\_ISL\_428368|2020-04-16*  
*hCoV-19/Turkey/HSGM-8992/2020|EPI\_ISL\_429855|2020-03-18*  
*hCoV-19/Turkey/HSGM-5516/2020|EPI\_ISL\_426713|2020-03-18*  
*hCoV-19/Turkey/HSGM-5769/2020|EPI\_ISL\_426717|2020-03-19*  
*hCoV-19/Turkey/HSGM-7718/2020|EPI\_ISL\_426719|2020-03-21*  
*hCoV-19/Turkey/HSGM-4706/2020|EPI\_ISL\_426712|2020-03-17*  
*hCoV-19/Turkey/ERAGEM-001/2020|EPI\_ISL\_424366|2020-03-17*  
*hCoV-19/Turkey/HSGM-10241/2020|EPI\_ISL\_429871|2020-03-23*  
*hCoV-19/Turkey/HSGM-5602/2020|EPI\_ISL\_426714|2020-03-18*  
*hCoV-19/Turkey/HSGM-8001/2020|EPI\_ISL\_426720|2020-03-21*  
*hCoV-19/Turkey/HSGM-5624/2020|EPI\_ISL\_426715|2020-03-18*  
*hCoV-19/Turkey/HSGM-8968/2020|EPI\_ISL\_429851|2020-03-22*  
*hCoV-19/Turkey/HSGM-8010/2020|EPI\_ISL\_426722|2020-03-22*  
*hCoV-19/Turkey/GLAB-CoV008/2020|EPI\_ISL\_427391|2020-04-13*  
*hCoV-19/Turkey/HSGM-4505/2020|EPI\_ISL\_429857|2020-03-17*  
*hCoV-19/Turkey/HSGM-4236/2020|EPI\_ISL\_429856|2020-03-16*  
*hCoV-19/Turkey/HSGM-4701/2020|EPI\_ISL\_429859|2020-03-17*  
*hCoV-19/Turkey/HSGM-11518/2020|EPI\_ISL\_429872|2020-03-25*  
*hCoV-19/Turkey/HSGM-4598/2020|EPI\_ISL\_429868|2020-03-17*  
*hCoV-19/Turkey/HSGM-8990/2020|EPI\_ISL\_429870|2020-03-22*  
*hCoV-19/Turkey/HSGM-8979/2020|EPI\_ISL\_429854|2020-03-22*  
*hCoV-19/Turkey/HSGM-8970/2020|EPI\_ISL\_429852|2020-03-22*  
**NC\_045512.2\_Wuhan\_seafood\_market\_pneumonia\_virus\_isolate\_Wuhan-Hu-1**  
*hCoV-19/Turkey/HSGM-5770/2020|EPI\_ISL\_426718|2020-03-19*  
*hCoV-19/Turkey/GLAB-CoV012/2020|EPI\_ISL\_428346|2020-04-17*  
*hCoV-19/Turkey/HSGM-8003/2020|EPI\_ISL\_426721|2020-03-21*  
*hCoV-19/Turkey/HSGM-11520/2020|EPI\_ISL\_429873|2020-03-23*  
*hCoV-19/Turkey/HSGM-5711/2020|EPI\_ISL\_426716|2020-03-18*  
*hCoV-19/Turkey/HSGM-8975/2020|EPI\_ISL\_429853|2020-03-22*

