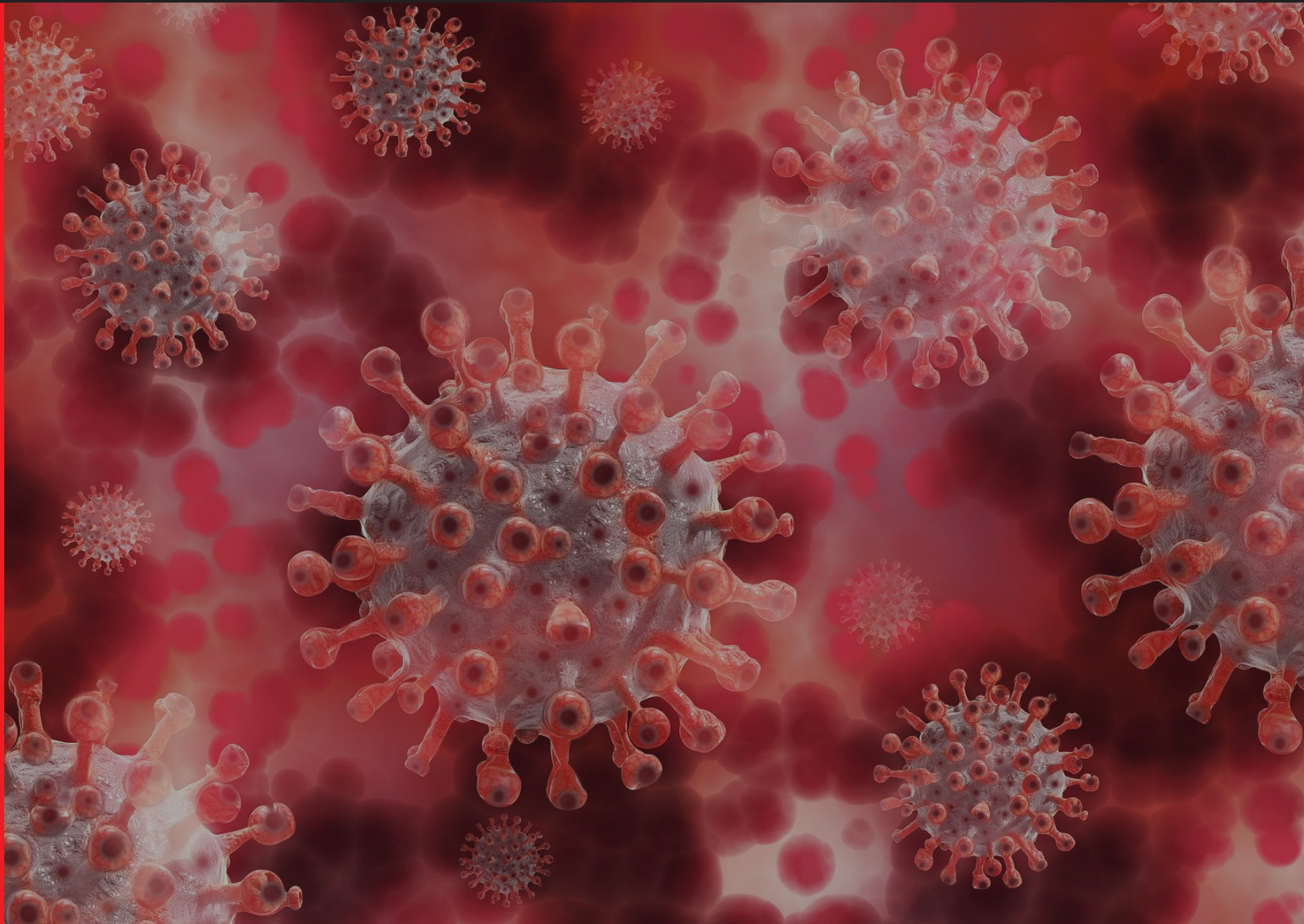


Coronavirus

Overview on SARS-CoV-2
detection workflow for research use

Detection Workflow SARS-CoV-2



Complete Extraction and Detection Workflow

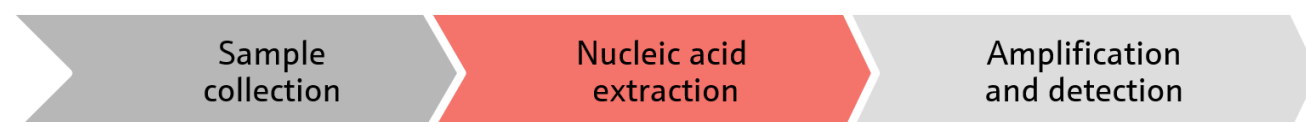
Analytik Jena offers a broad product portfolio in the field of nucleic acid extraction and PCR or real-time PCR with both extraction kits and the necessary equipment.

In December 2019 the novel SARS-CoV-2 (formerly named 2019-nCoV) was identified in Wuhan, the capital of China's province Hubei. Based on its rapid spreading with more than 105,000,000 confirmed cases by beginning of February 2021 the World Health Organization declared the outbreak a public health emergency of international concern^a.

Basic facts on SARS-CoV-2:

- (+) ss-RNA virus
- Related to SARS-CoV and MERS-CoV
- Detection based on basis of PCR

For research purposes for the detection of SARS-CoV-2 the following workflow is suggested.



1. Sample collection

In principle, respiratory material such as nasopharyngeal and oropharyngeal swabs are suitable for the detection of respiratory pathogens. For more detailed information, recommendations of the WHO^b or other institutions should be observed. Serum can also be used for serological tests, acute and convalescence samples.

2. Nucleic acid extraction

Analytik Jena offers the liquid handling platforms InnuPure C16 touch and CyBio FeliX for automated nucleic acid extraction according to sample throughput. For both system extraction procedures for dedicated virus DNA/RNA extraction kits have been established and ready-to-use extraction protocols are included in the pre-installed software. A detailed overview is shown in Table 1 below.

Table 1: Overview on Analytik Jena's liquid handling platforms for automated nucleic acid extraction with corresponding pre-established kits for extraction of virus DNA/RNA.

Sample throughput	Extraction platform		Ready-to-use protocols for corresponding extraction kits. ^d	
	Name	Key features	Extraction kit	Kit supplier
Middle	InnuPure C16 touch	Up to 16 samples / 31 - 84 min Closed extraction system for dedicated extraction kits only	innuPREP AniPath DNA/RNA Kit - IPC16, non-filled innuPREP AniPath DNA/RNA Kit - IPC16 innuPREP Virus DNA/RNA Kit - IPC16, non-filled innuPREP Virus DNA/RNA Kit - IPC16	Innuscreen GmbH
High	CyBio FeliX & CyBio FeliX Extraction Set	Up to 96 samples / 62 - 73 min Open extraction platform with dedicated pre-established extraction kits Open liquid handling platform (e.g. qPCR setup, serial dilution)	innuPREP AniPath DNA/RNA Kit - FX ^c innuPREP Virus TS RNA Kit 2.0 - FX innuPREP Virus DNA/RNA Kit - FX	Innuscreen GmbH

^a <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>

^b Laboratory testing for 2019 novel coronavirus (2019-nCoV) in suspected human cases Interim guidance, WHO, 17 January 2020

^c Release planned for autumn 2021

^d Please note that extraction kits are available via the corresponding supplier.

3. Amplification and detection

Molecular assays to detect SARS-CoV-2 have been developed and are accessible through the homepage of the WHO^e. Furthermore, several commercial kits based on real-time PCR are available. Table 2 below shows all available detection kits which are tested on qTOWER³ and/or qTOWER³ 84.

The PCR setup can be pipetted by a liquid handling platform like CyBio FeliX. Using PCR workstations or cabinetts offer maximum safety and minimize contamination risks. In general real-time PCR-based assays can be established on real-time thermal cycler of the qTOWER³ family provided by Analytik Jena or similar.

Please note that products of Analytik Jena GmbH listed here are not explicitly marked as CE IVD and are exclusively intended for research purposes. The validation of the kits was performed by the assay manufacturers themselves on qTOWER devices and was subsequently CE IVD or FDA EUA certified.



Table 2: Overview of molecular detection assays (SARS-CoV-2 detection, SARS-CoV-2 mutation detection only or parallel SARS-CoV-2 and Influenza detection) which are successfully tested on qTOWER³ and/or qTOWER³ 84 and/or validated by the assay manufacturer including certification as indicated by footnotes.

Company	Assay Name
Assays detecting SARS-CoV-2	
Altona Diagnostic	RealStar® SARS-CoV-2 RT-PCR Kit 1.0 RUO
BGI Genomics	Real-Time Fluorescent RT-PCR Kit for Detecting SARS-2019-nCoV
EuroImmun	EuroRealTime SARS-CoV-2 ^f
Fosun Pharma USA	Fosun COVID-19 RT-PCR Detection Kit
IDEXX	Water SARS-CoV-2 RT-PCR Test
Ingentix	ViroReal® Kit SARS-CoV-2 & SARS ^f
Inno-Train Diagnostik GmbH	Covid-19 FluoGene Q ^f
Mikrogen	ampliCube Coronavirus SARS-CoV-2 / ampliCube Coronavirus Panel
Perkin Elmer	SARS-CoV-2 RT-qPCR Reagent kit / New Coronavirus Nucleic Acid Detection Kit ^{g,h}
PrimerDesign	Coronavirus (COVID-19)
Procomcure Biotech	PhoenixDx® SARS-CoV-2 IVD ^f
R-Biopharm	RIDA®GENE SARS-CoV-2 RUO
RTA Laboratories	Diagnovital SARS-CoV-2 Multiplex ^f
Seegene	Allplex™ 2019-nCoV Assay
Shimadzu	2019 Novel Coronavirus Detection Kit
Siemens healthineers/ Fast-Track Diagnostic	FTD SARS-CoV-2 Assay (RUO)
SolGent	DiaPlexQ Novel Coronavirus (2019-nCoV) Detection Kit
TIB MOLBIOL	TIB MOLBIOL LightMix® Modular SARS-CoV-2 (COVID19) RdRP / TIB MOLBIOL LightMix® Modular SARS-CoV.2 (COVID19) E-gene
Wells Bio	careGENE™ COVID-19 RT-PCR Kit / careGENE™ N-Cov RT-PCR Kit

^e <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/laboratory-guidance>

^f CE IVD (qTOWER³)

^g FDA EUA (qTOWER³)

^h FDA EUA (qTOWER³ 84)

ⁱ FDA EUA (qTOWER³) pending

Company	Assay Name
Assays detecting SARS-CoV-2 mutations	
TIB MOLBIOL	TIB MOLBIOL VirSNiP SARS-CoV-2 Spike 501Y
Inno-Train Diagnostik GmbH	Covid-19 FluoGene Q N501Y (RUO)
Assays detecting SARS-CoV-2 and Influenza viruses	
EuroImmun	EURORealTime SARS-CoV-2/Influenza A/B ^f
Ingentix	ViroReal [®] Kit SARS Coronavirus & Influenza A/B ^f
Mikrogen	ampliCube Respiratory Flu & SARS-CoV-2
R-Biopharm	RIDA [®] GENE Flu & SARS-CoV-2 RUO
Assays particularly tested for wastewater samples*	
EuroImmun	EuroRealTime SARS-CoV-2
IDEXX	Water SARS-CoV-2 RT-PCR Test
Inno-Train Diagnostik GmbH	Covid-19 FluoGene Q
Inno-Train Diagnostik GmbH	Covid-19 FluoGene Q N501Y (RUO)
Zymo Research	Quick SARS-CoV-2 Multiplex Kit

* Wastewater samples were prepared according to the workflow established by Analytik Jena. Real-time PCR using the indicated assay was implemented on qTOWER³.

Headquarters

Analytik Jena GmbH
Konrad-Zuse-Str. 1
07745 Jena · Germany

Phone +49 3641 77 70
Fax +49 3641 77 9279
info@analytik-jena.com
www.analytik-jena.com

Bilder: Analytik Jena GmbH, © pixabay - GertAltmann
Subject to changes in design and scope of delivery as well as further technical development.

More Information ►
www.analytik-jena.com/cov