Innovative automation supports laboratory testing workflow

Novacyt has unveiled the new CO-Prep™ Automated Liquid Handling System designed for use with the PROmate® COVID-19 assay workflows, which can also be used to support busy laboratories and private healthcare providers to perform efficient COVID-19 testing. It was developed for those who want to automate or deskill their COVID-19 workflows, freeing up time that would otherwise be spent on manual pipetting, for the lab operators to add value elsewhere. CO-Prep™ optimises liquid handling for PROmate®COVID-19 assays, an established total workflow solution, which includes sample preparation, qPCR amplification, and analysis on the genesig® q16 and q32 qPCR instruments. This is specifically for the qualitative detection of nucleic acid from SARS-CoV-2 from anterior nasal and throat samples prepared on dry swabs. These direct-to-PCR assays require only one pipetting step – manual until now - to transfer 5 µl of sample into the 0.1 ml PCR tube, ready for amplification. With CO-Prep™, this one pipetting step is automated, which reduces the risk of contamination and improves the accuracy of results by removing human experimental variation. **Rebecca Underwood, Novacyt's Senior Product Manager** for the new CO-Prep™ system, said: "We were asked to address the need for no manual handling of the pipetting process, and with CO-Prep™, by automating the pipetting, we're creating walkaway time, freeing up the operator to do other tasks." **Sample tracking** A key feature of the system is its ability to track each patient sample throughout the workflow, from swab to results. Sample/patient barcodes, as well as the QR codes on the set-up plates, can be scanned to upload the information to the CO-Prep™ software. QR barcodes are provided in PROmate® kits. Once the samples have been prepared for qPCR amplification, the sample/patient IDs are transferred easily across to the genesig® software, ready for the results to be recorded. The CO-Prep™ software application also has an option to create sample queues, so that multiple set up plates can be prepared in advance. This helps to increase sample throughputs and delivers additional walkaway time. **Mark Coldwell, Novacyt's Head of Scientific Communications**, says: "The whole CO-Prep™ system has been designed to be as user-friendly as possible, providing accurate and precise auto-pipetting. Coming from an academic testing environment myself, I can understand the need to make the laboratory workflow more efficient, and CO-Prep™ requires minimal training – which we provide on set-up – before it becomes an integral part of everyday use. The software is simple and intuitive to use and gives busy laboratories the means to increase daily throughput." The CO-Prep™ software application has been designed for ease of use, to allow runs to be quickly set up, queued, and executed with minimal steps within a simplified workflow. It tracks and records samples, set up plates and unique magazine identifiers to ensure traceability of clinical samples. The system also shows run progress and provides alerts when sample preparation is complete. CO-Prep™ requires a PC/laptop/tablet to operate it, but it does not require a dedicated I.T. system; the same PC/laptop can run both the CO-Prep™ and the genesig® software simultaneously. **Mobility** Another CO-Prep™ attribute is its compact size. It was designed with a small footprint that minimizes laboratory bench space or fits easily into a Class II Biological Safety Cabinet (BSC) to suit the individual requirements, particularly if the testing is being carried out in the field or near-to-patient. CO-Prep™ features three separate zones for each step in the automated liquid handling process. Zone 1, the pipette tips rack, holds 96 pipette tips. The system is validated to work with two tip types: ThermoFisher 50 µl filter pipette tips, and Tecan 50 µl filter pipette tips. The CO-Prep™ features a user-changeable magnetic pipette module calibrated to ISO 8655 standards. The pipette module is calibrated in the x, y and z directions, which coupled with a high-resolution encoder provides accurate feedback on positioning and prevents any step loss during sample preparation. The calibrated pipette module uses reverse pipetting for accurate and consistent pipetting. The magnetic connection allows the pipette module to be removed and replaced instantly, so there is no downtime required for the recalibration of the pipette modules. Zone 2 is used for the sample setup plate, which holds the patient samples. The samples can either be in the sample preparation buffer tubes provided in the PROmate® test kits or in an NC-15 extraction plate. Zone 3 is used for the target plate. Depending on the instrument platform being used, the CO-Prep™ is provided with a q16 target plate that can hold 2 x q16 magazines and a q32 target plate which holds 1 x q32 magazine. **Easy cleaning** The system is also compatible with NC-15 extraction plates to support extracted samples and has an inbuilt UV sterilisation function for fast, chemical-free decontamination following cleaning. Sterilisation time can be customised to meet individual requirements and a record of sterilisation is saved in the CO-Prep™ software. The system has two tip waste containers that can easily be removed and cleaned. "CO-Prep has ease of use and expandability," says Mark. "It's

ideal for those who want to start small but then scale; it's very portable." **Video 3 - CO-Prep - What Is CO-PREP FINAL.m4v** – [Caption: Dr Andrew Birnie breaks down the unique capabilities of the Co-Prep™ Liquid handling system] **The PROmate® evolution** PROmate® itself has also evolved to meet changing customer demand. Launched 18 months ago, it was designed to further improve the workflow efficiency of COVID-19 testing when used in combination with Novacyt's q16 and q32 instruments. The reagents involved in COVID-19 RNA extraction and PCR test products were repackaged, to reduce the number of consumables and steps required. This cut operator complexity and improved cycle times. PROmate® uses a viral inactivation methodology validated by Public Health England for potential use outside of laboratory environments. CE Mark approved, the original one-gene target test has now been supplemented by a two-gene version, in response to evolving need during the COVID-19 pandemic. More recently, the PROmate® COVID-19 2G that can detect two SARS-CoV-2 targets within the ORF1ab has been validated by the UK Health Security Agency and given Coronavirus Test device Approval (CTDA) on its register of approved devices for COVID-19. Novacyt maintains one of the world's leading bio-surveillance systems, with daily monitoring to identify emerging variants of concern. Weekly reports are produced, to ensure that all Novacyt COVID-19 assays, including the PROmate® workflow, continue to perform excellently. For a free demonstration on the PROmate® and CO-Prep™ workflows, kindly contact **enquiries@primerdesign.co.uk**.