



**ISTITUTO ZOOPROFILATTICO SPERIMENTALE
DELLA LOMBARDIA E DELL'EMILIA ROMAGNA
“BRUNO UBERTINI”
(ENTE SANITARIO DI DIRITTO PUBBLICO)**

SELEZIONE PUBBLICA PER TITOLI E COLLOQUIO PER ASSUNZIONI A TEMPO DETERMINATO DI PERSONALE NEL PROFILO DI COLLABORATORE TECNICO PROFESSIONALE ADDETTO AI SERVIZI DI LABORATORIO - CAT. D – DA ASSEGNARE AL LABORATORIO SMEL (SERVIZIO MEDICINA DI LABORATORIO) DELLA SEDE DI BRESCIA DELL’ISTITUTO ZOOPROFILATTICO SPERIMENTALE DELLA LOMBARDIA E DELL’EMILIA ROMAGNA

PROVE ORALI

PROVA ORALE N° 1

Gestione delle contaminazioni in un laboratorio PCR

Due to the ease of use, relatively low cost, and minimal expertise required, one commonly used bacterial identification approach employed in clinical laboratories involves the use of chromogenic media.

PROVA ORALE N° 2

Tecniche molecolari di quantificazione della carica virale

On the basis of our predictive statistical models, there were an estimated 4,95 million (3,62–6,57) deaths associated with bacterial AMR in 2019, including 1,27 million (95% UI 0,911–1,71) deaths attributable to bacterial AMR.

PROVA ORALE N° 3

Tecniche di identificazione batterica

A standard curve was constructed using DNA template from serial dilutions yielding 1×10^9 to 1×10^2 CFU/ml of Salmonella Weltevreden. The amplified products were also separated by standard electrophoresis in a 1% agarose gel incorporated with ethidium bromide (1 mg/ml) and were visualized by UV transillumination.

PROVA ORALE N° 4

Principali componenti di una mix di reazione PCR

Specimen reception areas should be equipped to facilitate the safe handling and processing of diagnostic submissions, to avoid contamination of the work area, the personnel, cross-contamination



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among specimens and to allow easy disinfection in situations where specimen containers may have leaked.

PROVA ORALE N° 5

Controlli positivi di estrazione e amplificazione

Biological risk assessments are undertaken to inform and determine the policy and procedures that in turn give confidence that the laboratory procedures for each of the biological materials handled by the laboratory pose negligible danger to a country's animal and human populations.



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PROVA ORALE N° 6

Differenza tra dispositivi di protezione individuale e collettivi

With the rapid availability of genome sequences, laboratory-developed tests (LDTs) for the detection of the SARS-CoV-2 were quickly developed. The first LDTs relied primarily on the detection of SARS-CoV-2 envelope (E), RNA-dependent RNA polymerase (RdRp), and nucleocapsid (N) genes, but more recent rRT-PCR method targets include open reading frame 1 a/b (Orf1a/b) and the gene encoding spike (S) protein.

PROVA ORALE N° 7

Real-time PCR applicata alla diagnostica microbiologica: vantaggi e svantaggi rispetto ai metodi di microbiologia classica

The potential advantages that MALDI-TOF-MS offers over other techniques for microbial characterization include minimal sample preparation, rapid results, and negligible reagent costs.

PROVA ORALE N° 8

Cos'è l'antibiotico resistenza e qual è la sua importanza

The method for cell lysis needs to be carefully optimized so that the lysates provide similar performance in real-time RT-PCR as pure RNA templates. The method should preserve the gene expression profile and also prevent cellular and buffer components from interfering with amplification and detection.

PROVA ORALE N° 9

Prevenzione delle contaminazioni da RNAsi

CRITICAL STEP: All bacterial cultures should be treated as potentially pathogenic to the laboratory worker and colleagues. Therefore, the use of appropriate aseptic techniques, and the wearing of appropriate personal protective equipment are strongly recommended to maintain acceptable work health and safety standards and minimize exposure to harmful agents.

PROVA ORALE N° 10

Controllo interno di una reazione PCR – tipologie

Surveillance of antimicrobial resistance and monitoring of the prevalence of, and trends in, resistance in bacteria from animals, food, environment and humans, constitutes a critical part of animal health and food safety strategies.



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PROVA ORALE N° 11

Sanger. Basi della tecnica e come si conduce un sequenziamento

Where investigating diseases of unknown cause, multiple different specimens, that represent the different stages of the disease progression in an animal or the population of animals (e.g. the pre-clinical, early clinical, active clinical, chronically affected and convalescent phases) should be collected.

PROVA ORALE N° 12

Elettroforesi in gel d'agarosio

Receiving, unpacking and aliquoting specimens must be done in a way to avoid cross-contamination in order to guarantee reliable testing of samples and prevent exposure of personnel.

PROVA ORALE N° 13

Quantificazione mediante Real-Time PCR

The fast procedure enables rapid processing of multiple samples and is easy to automate. The reduced number of handling steps results in high reproducibility from samples to sample and minimizes the risk of contamination since less manipulation is required.

PROVA ORALE N° 14

Sequenziamento importanza e applicazioni

Rapid identification of the bacteria that are difficult to culture such as anaerobic bacteria, fastidious bacteria, slow growing *Mycobacteria*, and archaea is of clinical importance, although it is challenging.

PROVA ORALE N° 15

Vantaggi e criticità dell'impiego di tecniche PCR per la diagnostica

All six of the leading pathogens contributing to the burden of AMR in 2019 (E coli, S aureus, K pneumoniae, S pneumoniae, A baumannii, and P aeruginosa) have been identified as priority pathogens by WHO.



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PROVA ORALE N° 16

Estrazione degli acidi nucleici da colture batteriche

An accredited quality management system (QMS) enables a laboratory to identify, measure, control and improve various core processes that lead to improved performance. In simple terms: - say what you do: document procedures – do what you say: follow documented procedures – improve it: corrective action processes. – prove it: audits and quality control.

PROVA ORALE N° 17

Genotipizzazione batterica

Primers and hybridization probes to the Salmonella invA gene are shown in Table 3. The PCR reaction was optimized for MgCl₂ concentration and annealing temperature with Salmonella Typhimurium ATCC 14028 genomic DNA.

PROVA ORALE N° 18

Quali sono i principali meccanismi di antibiotico resistenza

Gently mix by tapping tube. Briefly centrifuge to settle tube contents. Prepare negative control reaction without template DNA. Prepare positive control reaction with template of known size and appropriate primers.

PROVA ORALE N° 19

Metodi di rilevazione di un prodotto di PCR/PCR Real Time

In 2017, WHO published a priority list for developing new and effective antibiotic treatments. The list was intended to inform research and development priorities related to new antibiotics and put the most emphasis on pathogens with multidrug resistance that cause severe and often deadly infections in health-care and nursing home settings.

PROVA ORALE N° 20

Differenza tra sensibilità e specificità diagnostica

Real-time RT-PCR is an ideal tool for cell assays that require accurate analysis of gene expression. However, high-throughput assays are difficult to achieve, since the purification of RNA from large numbers of cultured-cell samples involves both time and effort.



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PROVA ORALE N° 21

Sybr Green real-time PCR: principi e limiti rispetto ad un saggio TaqMan

Successful amplification of the region of interest depends upon the amount and quality of the template DNA. Reagents commonly used to purify nucleic acids (e.g. salts, guanidine, proteases, organic solvents and SDS) are potent inhibitors of DNA polymerases.

PROVA ORALE N° 22

Estrazione degli acidi nucleici da un tessuto animale

Whole blood samples may be collected for haematology, clinical chemistry, toxicology, direct examination for bacteria or parasites, PCR testing, immunological testing, or for culture for bacteria or viruses.

PROVA ORALE N° 23

Retro Trascrizione. Descrizione ed uso.

The laboratory should be easy to clean, with surfaces that are impervious to water and resistant to chemicals used in the laboratory. There shall be a hand-wash basin, emergency shower, and eye wash station in each laboratory suite as appropriate for the chemicals and other hazards present.

PROVA ORALE N° 24

Cosa si intende per multiplex PCR

Dependent on the suspected disease, condition of the carcass and facilities available for necropsies post-mortem specimens can be collected from one or multiple organs and submitted to the laboratory as either fresh (no preservative) or preserved specimens for further laboratory testing.

PROVA ORALE N° 25

Prevenzione dei rischi di cross-contaminazione nelle varie fasi di analisi di un campione con PCR.

Laboratory and animal facilities managers are responsible for providing a management system that ensures safe and secure handling, storage, and transport of these biological materials (a biological risk management system).



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PROVA ORALE N° 26

Strumentazione in un laboratorio di diagnostica molecolare

Selection, collection, preparation, preservation and management of samples are critical variables in design and development of an assay to ensure valid test results. Other variables such as transport, chain of custody, tracking of samples, and laboratory information management system are also key sources of variation/error.

PROVA ORALE N° 27

Varianti virali: significato e metodiche utilizzate per l'individuazione

Most new real-time cyclers are installed with thermal-cycling modules that provide high ramping rates (i.e., fast heating and cooling capacities). This technology shortens the time to switch from one temperature to another, allowing faster run times in real-time PCR.

PROVA ORALE N° 28

Il problema delle inibizioni in PCR, controlli e strategie operative

Comparison of the sequences of conserved genes, most commonly those encoding 16S rRNA, is used for bacterial genotypic identification. Among some taxa, such as the Enterobacteriaceae, variation within this gene does not allow confident species identification.

PROVA ORALE N° 29

Tecniche di rilevamento delle antibiotico resistenze

Real-time PCR and RT-PCR are highly sensitive techniques enabling amplification and quantification of a specific nucleic acid sequence with detection of the PCR product in real time. Quantification of DNA, cDNA, or RNA targets can be easily achieved by determining the cycle when the PCR product can first be detected.

PROVA ORALE N° 30

Confronto tra sequenziamento Sanger e NGS

Although many proteins, including enzymes, are common to most bacteria, a range of unique biochemical pathways define each bacterial genus and the proteins expressed can even differ between species within a genus. These differences in protein expression between bacteria can be exploited in tests for specific bacteria, providing identities with relatively good certainty.



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PROVA ORALE N° 31

Circuiti inter-laboratorio: significato e scopo

In common with ribosomal RNA-encoding genes, the *rpoB* encoding the bacterial RNA polymerase β subunits universal, and comparison of *rpoB* sequences has been used as a basis for phylogenetic analyses among some Archae and bacteria.

PROVA ORALE N° 32

Organizzazione delle aree di prova di un laboratorio di diagnostica molecolare

Complete removal of liquid at each step is essential to good assay performance. After the last wash, remove any remaining Wash Buffer by aspirating or decanting. Invert the plate and blot it against clean paper towels.

PROVA ORALE N° 33

Descrivere le fasi ed il principio della Reazione a catena della Polimerasi (PCR)

Laboratory investigation of animal disease is critically dependent on the quality and appropriateness of the specimens collected for analysis. This chapter sets out the general standards involved in specimen collection, submission and storage.
