CONCORSO PUBBLICO, PER ESAMI, A N. 1 POSTO DI CATEGORIA D, POSIZIONE ECONOMICA D1, AREA TECNICA, TECNICO-SCIENTIFICA ED ELABORAZIONE DATI, PER LE ESIGENZE DEL DIPARTIMENTO DI SCIENZE MEDICHE TRASLAZIONALI DELL'UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II (COD. RIF. 2235), INDETTO CON DECRETO DEL DIRETTORE GENERALE N. 1029 DEL 25.10.2022.

TRACCE ESTRATTE ALLA PROVA ORALE DEL 07.02.2023

PROVA 2

Primo quesito – Conoscenza degli argomenti previsti per la prova scritta e declinati nell'art. 6 del bando DG/2022/1029 del 25/10/2022 (Albo Ufficiale N.R. 8533/2022)

Il/La candidato/a descriva la tecnica della PCR quantitativa (qPCR) e le sue applicazioni nella diagnostica di laboratorio.

Secondo quesito – Conoscenza delle apparecchiature e delle applicazioni informatiche

Il/La candidato/a illustri un esempio di compilazione del foglio di calcolo del software Excel della suite Microsoft Office.

Terzo quesito – Conoscenza della lingua inglese

Il/La candidato/a legga il seguente testo in inglese e poi traduca in italiano.

On 31 December 2019, the Wuhan Municipal Health Commission reported an outbreak of pneumonia on its official website. Subsequently, scientists reported the discovery of a previously undescribed coronavirus obtained from samples of the respiratory system of some of these patients. This virus differed from all known coronaviruses including severe acute respiratory syndrome (SARS) coronavirus (SARS-CoV) and Middle East respiratory syndrome (MERS) coronavirus (MERS-CoV). The World Health Organization (WHO) named the disease coronavirus disease 2019 (COVID-19) and the International Committee on Taxonomy of Viruses named this new infectious agent SARS-CoV-2; the seventh coronavirus that can infect humans. SARS-CoV-2 rapidly spread through the globally, producing several variants of concern (VOCs) and developing into a major and devastating pandemic. Here we summarize our current understanding of the emergence, global spread and genetic diversity of SARS-CoV-2.

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PROVA 3

Primo quesito – Conoscenza degli argomenti previsti per la prova scritta e declinati nell'art. 6 del bando DG/2022/1029 del 25/10/2022 (Albo Ufficiale N.R. 8533/2022)

Il/La candidato/a descrive la metodica di sequenziamento Sanger del DNA e le sue applicazioni nella diagnostica di laboratorio.

Secondo quesito – Conoscenza delle apparecchiature e delle applicazioni informatiche

Il/La candidato/a descriva come disegnare un grafico nel foglio di calcolo del software Excel della suite Microsoft Office.

Terzo quesito – Conoscenza della lingua inglese

Il/La candidato/a legga il seguente testo in inglese e poi traduca in italiano.

From the earliest genomic comparisons, it was clear that SARS-CoV-2 had a genomic organization similar to SARS-CoV. The spike proteins of both viruses have similar three-dimensional structures, suggesting that these viruses might use the same cell surface receptor—human angiotensin-converting enzyme 2 (ACE2): this was soon confirmed in vitro and using structural biology. However, SARS-CoV-2 differs from SARS-CoV in two fundamental ways. First, there are six amino acid positions in the receptor-binding domain (RBD) of the spike protein that mediate the attachment of the SARS-CoV and SARS-CoV-2 spike proteins to the human ACE2 receptor. However, amino acids at five of the six positions differed between SARS-CoV and SARS-CoV-2. Notably, such differences caused SARS-CoV-2 to have a higher binding avidity to the human ACE2 receptor, and may have contributed to the higher transmissibility of SARS-CoV-2 compared with SARS-CoV. *https://doi.org/10.1038/s41586-021-04188-6*

PROVA 4

Primo quesito – Conoscenza degli argomenti previsti per la prova scritta e declinati nell'art. 6 del bando DG/2022/1029 del 25/10/2022 (Albo Ufficiale N.R. 8533/2022)

Il/La candidato/a descrive la metodica del pirosequenziamento e le sue applicazioni nella diagnostica di laboratorio.

Secondo quesito – Conoscenza delle apparecchiature e delle applicazioni informatiche

Il/La candidato/a descriva come inserire una formula nel foglio di calcolo del software Excel della suite Microsoft Office.

Terzo quesito – Conoscenza della lingua inglese

Il/La candidato/a legga il seguente testo in inglese e poi traduca in italiano.

Second, there is a 12-nucleotide (nt) insertion at the cleavage site of the spike protein of SARS-CoV-2 that has not yet been identified in closely related betacoronaviruses, but that has a complex evolutionary history across the coronaviruses as a whole, indicating that it is evolutionarily volatile. This insertion encodes four amino acids -PRRA- that can be recognized by the protease furin, which is extensively expressed in different tissues and organs. This insertion may decrease the overall stability of the SARS-CoV-2 spike, thereby facilitating the adoption of the open conformation that is required for the binding of the spike to human ACE2; SARS-CoV-2 without this furin-cleavage site shows reduced replication in a human respiratory cell line and was attenuated in laboratory animals. Notably, amino acid substitutions have been documented at all four positions in the PRRA motif, with a P-to-H substitution (HRRA) identified in more than 487,000 viral genomes as of June 2021.

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PROVA 6

Primo quesito – Conoscenza degli argomenti previsti per la prova scritta e declinati nell'art. 6 del bando DG/2022/1029 del 25/10/2022 (Albo Ufficiale N.R. 8533/2022)

Il/La candidato/a definisca le differenze tra il metodo della PCR e della PCR quantitativa (qPCR).

Secondo quesito – Conoscenza delle apparecchiature e delle applicazioni informatiche

Il/La candidato/a illustri con quale comando è possibile inserire un grafico in una presentazione del software PowerPoint della suite Microsoft Office.

Terzo quesito – Conoscenza della lingua inglese

Il/La candidato/a legga il seguente testo in inglese e poi traduca in italiano.

Whether SARS-CoV-2 was introduced through a laboratory accident or whether it has been genetically manipulated is highly debatable. After a thorough analysis of the genetic characterizations of SARS-CoV-2 from both the early and later stages of the pandemic, as well as its close relatives from wild animals, many researchers in the global scientific community have reached the consensus that SARS-CoV-2 is unlikely to have escaped a laboratory and there is no scientific evidence that SARS-CoV-2 has been genetically manipulated. However, the exact spillover event and emergence process of SARS-CoV-2 is still unclear, and more information from the earliest stage of the epidemic is clearly important to understand how SARS-CoV-2 came into contact with people.

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PROVA 8

Primo quesito – Conoscenza degli argomenti previsti per la prova scritta e declinati nell'art. 6 del bando DG/2022/1029 del 25/10/2022 (Albo Ufficiale N.R. 8533/2022)

Il/La candidato/a descriva le procedure da effettuare per la corretta preservazione dei campioni di buffy coat.

Secondo quesito – Conoscenza delle apparecchiature e delle applicazioni informatiche

Il/La candidato/a illustri come è possibile stampare in bianco e nero, con una stampante a colori una diapositiva a colori in una presentazione del software PowerPoint della suite Microsoft Office.

Terzo quesito – Conoscenza della lingua inglese

Il/La candidato/a legga il seguente testo in inglese e poi traduca in italiano.

Guangdong is a populous province in Southeast China, with a resident population of more than 100 million people. After the SARS-CoV outbreak, believed to have originated in Guangdong, long-term reforms in public-health agencies have greatly improved the infrastructures and enhanced the capacity of disease control and prevention. The first case of COVID-19 in Guangdong had an onset of symptom on 1 January and was reported on 19 January 2020. Like many other Chinese provinces, Guangdong experienced three phases—domestic importation, local community transmission and international importation—with an epidemic peak in early February 2020. Large-scale surveillance (around 1.6 million tests by 19 March 2020 identifying 1,388 cases of COVID-19) and intervention measures were implemented from the beginning of the outbreak, and after 22 February 2020 no more than one case a day was reported. The genomic epidemiology of SARS-CoV-2 in Guangdong showed that most of the infections before March were imported from Hubei Province, and, in particular, Wuhan.

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PROVA 9

Primo quesito – Conoscenza degli argomenti previsti per la prova scritta e declinati nell'art. 6 del bando DG/2022/1029 del 25/10/2022 (Albo Ufficiale N.R. 8533/2022)

Il/La candidato/a descriva le procedure da effettuare per la corretta preservazione dei campioni di plasma e siero.

Secondo quesito – Conoscenza delle apparecchiature e delle applicazioni informatiche

Il/La candidato/a descriva l'inserimento di animazioni in presentazione del software PowerPoint della suite Microsoft Office.

Terzo quesito – Conoscenza della lingua inglese

Il/La candidato/a legga il seguente testo in inglese e poi traduca in italiano.

The first case of COVID-19 in the USA (sequence WA1) was reported on 20 January 2020—a traveller from Wuhan. By 15 February 2020, the number of laboratory-confirmed and clinically diagnosed cases of COVID-19 had reached 15. By combining multiple sources of information, Worobey and colleagues showed that transmission of the WA1 (belonging to lineage A) lineage was successfully contained, and the subsequent larger outbreaks in Washington state might have been caused by multiple independent introductions of the virus from China in late January or early February 2020. However, evidence from various studies revealed that the early viruses that were present between 29 February and 18 March 2020 in New York City were imported from Europe and other parts of the USA by multiple, independent introductions. In addition, cryptic transmission and a prolonged period of unrecognized community spread has been documented in northern California, Washington state and New York City from late January to March 2020.

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PROVA 10

Primo quesito – Conoscenza degli argomenti previsti per la prova scritta e declinati nell'art. 6 del bando DG/2022/1029 del 25/10/2022 (Albo Ufficiale N.R. 8533/2022)

Il/La candidato/a descriva le procedure da effettuare per la corretta preservazione di campioni bioptici.

Secondo quesito – Conoscenza delle apparecchiature e delle applicazioni informatiche

Il/La candidato/a descriva i principali utilizzi del software Word della suite Microsoft Office.

Terzo quesito – Conoscenza della lingua inglese

Il/La candidato/a legga il seguente testo in inglese e poi traduca in italiano.

The initial SARS-CoV-2 outbreak in Wuhan can itself be divided into three phases: (1) rapid transmission before the implementation of the large-scale population 'lockdown' of the city on 23 January 2020, with an estimated effective reproduction number (Re) of 3.5 (95% credible interval, 3.4–3.7) during this period; (2) reduction of the rate of virus transmission during the period 23 January–1 February 2020 (through lockdown and home quarantine), producing an average Re of 1.2 (95% credible interval, 1.1-1.3); and (3) the interruption of transmission through intensified stringent interventions during 2–16 February 2020 (centralized isolation and treatment of cases of COVID-19) and 17 February–8 March 2020 (community screening). Population-based serological surveys conducted during March–May 2020 revealed that the overall seropositivity rate in Wuhan was 3.2–4.4%, indicating that many cases went undetected due to asymptomatic and mild infections and the limited laboratory-diagnosis capacity during the early stages of the outbreak.

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PROVA 11

Primo quesito – Conoscenza degli argomenti previsti per la prova scritta e declinati nell'art. 6 del bando DG/2022/1029 del 25/10/2022 (Albo Ufficiale N.R. 8533/2022)

Il/La candidato/a descriva la metodica della citometria a flusso e la sua applicazione per lo studio delle malattie umane.

Secondo quesito – Conoscenza delle apparecchiature e delle applicazioni informatiche

Il/La candidato/a illustri l'utilizzo della funzionalità "conteggio parole" e suo utilizzo all'interno del software Word della suite Microsoft Office.

Terzo quesito – Conoscenza della lingua inglese

Il/La candidato/a legga il seguente testo in inglese e poi traduca in italiano.

The coincidence of the emergence of SARS-CoV-2 and the large-scale seasonal migration (Chunyun, starting from 10 January 2020) for the Chinese Lunar New Year holiday probably exacerbated the seeding of the virus across China. Movement restrictions from Wuhan, the key transportation hub in central China, commenced on 23 January 2020, and reduced the peak population numbers leaving the city 2 days before the Lunar New Year. Unfortunately, however, the disease had spread to every province in mainland China by this time. In general, after the rapid implementation of stringent and integrated NPIs, the Re in provinces outside Hubei decreased below the epidemic threshold (1.0) from 8 February 2020. Compared with Wuhan, the seropositivity rate in cities outside Wuhan was much lower. According to a national COVID-19 sero-epidemiological survey in China during March–May 2020, only 0.44% of the sampled population in other cities of Hubei were positive, and only 2 out of more than 12,000 people outside Hubei tested positive, suggesting that SARS-CoV-2 transmission was well contained across the country during the first wave.

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PROVA 12

Primo quesito – Conoscenza degli argomenti previsti per la prova scritta e declinati nell'art. 6 del bando DG/2022/1029 del 25/10/2022 (Albo Ufficiale N.R. 8533/2022)

Il/La candidato/a descriva la metodica dell'immunofluorescenza e la sua applicazione per lo studio delle malattie umane.

Secondo quesito – Conoscenza delle apparecchiature e delle applicazioni informatiche

Il/La candidato/a illustri l'utilizzo del comando "sostituisci" all'interno del software Word della suite Microsoft Office.

Terzo quesito – Conoscenza della lingua inglese

Il/La candidato/a legga il seguente testo in inglese e poi traduca in italiano.

More than 6,000 incoming travellers from abroad who were infected with SARS-CoV-2 had been reported in mainland China by 15 June 2021, although reverse-transcriptase–polymerase-chain-reaction (RT–PCR) testing at the border control and a 14-day centralized quarantine implemented in China since March 2020 greatly reduced any transmission risk. For example, in Guangzhou, Guangdong Province in southern China, 73.5% of the imported positive cases were detected at the immigration checkpoint and 19.0% during centralized quarantine in hotels. Although SARS-CoV-2 is predominantly associated with respiratory transmission, since June 2020, multiple Chinese provinces have detected SARS-CoV-2 RNA or live virus on packages of frozen products. Indeed, cold-chain food or package contamination was proposed to have triggered the resurgence in Beijing in June 2020 as well as other sporadic outbreaks in China, although this warrants further investigation.
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PROVA 14

Primo quesito – Conoscenza degli argomenti previsti per la prova scritta e declinati nell'art. 6 del bando DG/2022/1029 del 25/10/2022 (Albo Ufficiale N.R. 8533/2022)

Il/La candidato/a descriva le principali tecniche di genotipizzazione e la loro applicazione per lo studio delle malattie umane.

Secondo quesito – Conoscenza delle apparecchiature e delle applicazioni informatiche

Il/La candidato/a descriva le periferiche di input utilizzate per l'immissione dei dati nella memoria centrale di un computer.

Terzo quesito – Conoscenza della lingua inglese

Il/La candidato/a legga il seguente testo in inglese e poi traduca in italiano.

From Europe to other regions. However, international travel outside China from mid-February to late-March 2020 facilitated the second phase of international SARS-CoV-2 spread and onward transmissions, with the epicentre quickly shifting to the Middle East and Europe. Although France was the first country to identify cases of COVID-19 in Europe, Italy soon became the first major hotspot in the continent, whereas Spain, Belgium and the UK reported the highest numbers of deaths in Europe during the first wave. The virus exported from Europe acted as a major source of global spread, and the WHO eventually declared a pandemic on 11 March 2020. Countries quickly placed restrictions on flights from Europe during March–April 2020, although these measures could not fully prevent introduced transmission.

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PROVA 15

Primo quesito – Conoscenza degli argomenti previsti per la prova scritta e declinati nell'art. 6 del bando DG/2022/1029 del 25/10/2022 (Albo Ufficiale N.R. 8533/2022)

Il/La candidato/a descriva il concetto di Sistema Qualità nella gestione del laboratorio biomedico.

Secondo quesito – Conoscenza delle apparecchiature e delle applicazioni informatiche

Il/La candidato/a descriva le periferiche di output che forniscono all'utente i dati in uscita dalla memoria centrale di un computer.

Terzo quesito – Conoscenza della lingua inglese

Il/La candidato/a legga il seguente testo in inglese e poi traduca in italiano.

By late March 2020, cases surged in the USA, with North America becoming the global epicentre. By the end of 2020, the total number of confirmed cases recorded in the USA had passed 20 million, including more than 350,000 reported deaths. Although the first case of COVID-19 in the USA was reported in a traveller returning from China on 20 January 2020, phylogenetic evidence suggests that importations from Europe mainly contributed to the wide spread of the virus across the country. Latin America and south Asia have also been badly affected. SARS-CoV-2 was confirmed in Brazil on 25 February 2020 and a month later it was found in every state, with confirmed cases exceeding 1 million on 19 June 2020. Although the first case of COVID-19 was confirmed in India on 30 January 2020 and the situation was seemingly under control until the end of March 2020, India has reported the second highest number of cases of COVID-19 since September 2020.

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PROVA 16

Primo quesito – Conoscenza degli argomenti previsti per la prova scritta e declinati nell'art. 6 del bando DG/2022/1029 del 25/10/2022 (Albo Ufficiale N.R. 8533/2022)

Il/La candidato/a descriva i concetti di certificazione e di accreditamento applicati al laboratorio biomedico.

Secondo quesito – Conoscenza delle apparecchiature e delle applicazioni informatiche

Il/La candidato/a descriva le principali funzionalità del sistema operativo Windows.

Terzo quesito – Conoscenza della lingua inglese

Il/La candidato/a legga il seguente testo in inglese e poi traduca in italiano.

NPIs—such as travel restrictions, case isolation and contact tracing, physical distancing, face covering, hand washing and even the closures of businesses and schools—have been widely implemented to reduce the transmission of SARS-CoV-2. Full or partial lockdowns during specific periods have also been imposed in many countries. Although the effectiveness of different interventions and their combinations have varied, these measures have had an important role in the response to the first wave of the pandemic. Unfortunately, after the relaxation of these interventions, an increase in population movements and the spread of new variants with a higher transmissibility, a new wave of infections has swept through many nations since October 2020. The first US wave in 2020 mainly affected the northeast of the USA, whereas the second wave in summer 2020 mainly hit the south and west, and almost every state has seen a spike in cases during the third wave since October 2020.

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PROVA 17

Primo quesito – Conoscenza degli argomenti previsti per la prova scritta e declinati nell'art. 6 del bando DG/2022/1029 del 25/10/2022 (Albo Ufficiale N.R. 8533/2022)

Il/La candidato/a descriva i concetti di organizzazione di un laboratorio biomedico.

Secondo quesito – Conoscenza delle apparecchiature e delle applicazioni informatiche

Il/La candidato/a descriva il comando del sistema operativo Windows copia/incolla/taglia applicato ad un file.

Terzo quesito – Conoscenza della lingua inglese

Il/La candidato/a legga il seguente testo in inglese e poi traduca in italiano.

The emergence of these SARS-CoV-2 variants has shaped the complex global transmission dynamics of COVID-19. More importantly, there is mounting evidence that these SARS-CoV-2 variants are able to cause decreases in neutralizing titres from patients who recovered from COVID-19 and vaccine recipients, and escape neutralization by the monoclonal antibodies that target the NTD and RBD of the spike protein to various degrees. However, genomic surveillance would be more informative if coupled with a system for the risk assessment and phenotyping of these mutations. For example, the infectivity and antigenicity of 106 mutations in the SARS-CoV-2 spike was assessed using pseudotyped viruses. Deep mutational scanning has also been used to assess all single amino acid variants of the SARS-CoV-2 spike protein. In addition, more and more data on antigenic variations of the SARS-CoV-2 variants, with different sets of single amino acid mutations, to monoclonal antibodies and vaccines are available.

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PROVA 18

Primo quesito – Conoscenza degli argomenti previsti per la prova scritta e declinati nell'art. 6 del bando DG/2022/1029 del 25/10/2022 (Albo Ufficiale N.R. 8533/2022)

Il/La candidato/a descriva il modello Hub & Spoke applicato ai laboratori biomedici.

Secondo quesito – Conoscenza delle apparecchiature e delle applicazioni informatiche

Il/La candidato/a descriva le principali funzionalità del sistema operativo IOS.

Terzo quesito – Conoscenza della lingua inglese

Il/La candidato/a legga il seguente testo in inglese e poi traduca in italiano.

That the major SARS-CoV-2 VOCs have reduced the efficacy of monoclonal antibodies and vaccines has posed serious challenges to the control of the COVID-19 pandemic. First, although vaccines can protect people infected with SARS-CoV-2 variants against severe disease, vaccine manufacturers are exploring redesigns of their products to obtain more effective protection—to eventually prevent virus transmission. Second, the suboptimal protection provided by vaccines and the deployment of antibody-based treatments of limited or undemonstrated efficacy has raised concerns that this would accelerate the emergence of new variants, although there is a strong argument for mass vaccination even if vaccines can only provide partial immunity. Third, this has also raised the possibility that SARS-CoV-2 will become a recurrent seasonal infection. Fourth, because vaccines cannot completely prevent transmission of the major variants, some NPIs such as face covering might have to be implemented to reduce transmission of the virus, as unlimited, large-scale spread of the variants would probably generate more new variants.

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Il Presidente della Commissione

F.to Prof. F Beguinot