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Editorial: Current advances in anti-infective strategies

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Infectious diseases pose a global challenge, necessitating an exploration of novel methodologies for diagnostics and treatments. Since the onset of the most recent pandemic, COVID-19, which was initially identified as a worldwide health crisis, numerous countries experienced profound disruptions in their healthcare systems. To combat the spread of the COVID-19 pandemic, governments across the globe have mobilized significant efforts and resources to develop treatments and vaccines. Researchers have put forth a multitude of approaches for COVID-19 detection, treatment protocols, and vaccine development, including groundbreaking mRNA technology, among others.

This matter represents not only a scientific endeavor but also an essential addition to our arsenal for combating infectious diseases. This concern is underscored by the inclusion of eleven articles in this issue, each highlighting the urgent need to boost global resources for investigating, detecting, treating, and responding to emerging infections. Furthermore, there is a pressing call for the effective coordination and guidance of Arabian research initiatives, in conjunction with the efforts of Afro-Asian countries, to collectively address the challenges at hand and enhance overall outcomes.

This special issue of Baghdad Science Journal on COVID-19 and anti-infective strategies provides an overview of infectious disease and anti-infective strategies management for detection, treatment protocol, and vaccine development including mRNA with many other strategies, by publishing articles on recent research concepts.

To harness the scientific potential of this field and enhance our understanding of pandemics and other infectious diseases, specialists from various disciplines, practices, and sectors were invited to contribute their research findings. The submissions from different scientific workers in various fields underscore the significance of antimicrobial strategies, which are notably gaining traction in many Afro-Asian countries. The special issue comprises 11 articles, the majority of which contribute significantly to the advancement of knowledge in their respective fields by highlighting the impacts of the COVID-19 pandemic, methods of detection, treatment modalities, and employing various modeling techniques to explore its interactions with numerous factors. Among these eleventh articles, several distinctive lessons have emerged, as outlined below:

The first articles[1] within the protection line by vaccine that submitted a study would help researchers to better understand how to forecast mRNA sequence molecule properties and develop a stable COVID-19 vaccine. This is achieved through the construction of a deep learning (DL) model, which predicts deterioration rates at each base of the mRNA molecule. A sequence DL model based on a bidirectional gated recurrent unit (GRU) is implemented. The model is applied to the Stanford COVID-19 mRNA vaccine dataset to predict the mRNA sequence deterioration by estimating five reactivity values for every base in the sequence. These values include reactivity values, deterioration rates at high pH, high temperature, high pH with Magnesium, and high temperature with Magnesium. The Stanford COVID-19 mRNA vaccine dataset is divided into a training set, validation set, and test set. The bidirectional GRU model minimizes the mean column-wise root mean squared error (MCRMSE) of deterioration rates at each base of the mRNA sequence molecule, achieving a value of 0.32086 for the test set. This outperforms the winning models by a margin of 0.02112.

The second articles[2] focused on detection methods to evaluate the activity of both Vaccine, AstraZeneca Oxford and Sinopharm, in Iraqi patients based on biochemical parameters (D-dimer and Immunoglobulin's IgG and IgM levels).

The third article[3] evaluates the impact of the COVID-19 vaccine on the hearing status of young individuals in the Iraqi medical school. This study concludes that there may be an effect on hearing, but it is neither clear nor consistent. Further comprehensive studies are needed to establish a relationship between hearing thresholds and the COVID-19 vaccine.

While the fourth article[4] demonstrated a post COVID-19 effect on medical staff and doctors' productivity in different specialties across Iraq. Analyses by machine learning revealed that older participants experienced a more pronounced decline in productivity, with a mean decrease of 35% compared to younger participants. Female participants, on average, had a 28% decrease in productivity compared to their male counterparts. Moreover, individuals with lower socioeconomic status exhibited a substantial decline in productivity, experiencing an average decrease of 40% compared to those with higher socioeconomic status. Similarly, participants who slept for fewer hours per night had a significant decline in productivity; with an average decrease of 33% compared to those who had sufficient sleep. The machine learning analysis identified age, specialty, COVID-19 complications, socioeconomic status, and sleeping time as crucial predictors of productivity score. The study highlights the significant impact of post-COVID-19 on the productivity of medical staff and doctors in Iraq. The findings can aid healthcare organizations in devising strategies to mitigate the negative consequences of COVID-19 on medical staff and doctors' productivity.

The fifth article[5], continue to focus on identifying parameters that aid in the detection and monitoring of coronavirus (COVID-19) infections in Iraqi patients. These parameters include ABO blood groups, D-dimer, ferritin, and CRP levels. The results of this article demonstrate that age plays a significant role in the development of COVID-19 infections. There is an observed association between ABO blood groups, D-dimer, CRP, and ferritin levels with the severity, progression, and susceptibility to COVID-19. However, it is important to note that this evidence requires further investigation.

At the same time, the sixth article[6] submitted anthropometric parameters in Iraqi Recovering

patients with Liver Enzymes and Lipid Profile. This article in special issue concluded that Covid 19 survivors experienced issues with their lipid profiles and liver enzymes. These parameters could be useful in follow up studies after treatments[6].

The seven article[7] made a comparative analysis of MFO, GWO and GSO for classification of Covid-19 chest X-Ray images which used in Covid-19 detection. This result is agreed with global result that CXR can be used to monitor the effects of COVID-19 on lung tissue.

The eight article[8] showed that the influence of obesity and IL-6 on infertile Iraqi women with COVID-19 complications. It concluded that the obesity and Corona-virus-infection negatively affect ovulation in infertile-women due to their effect on the pituitary-gland-hormones, in addition to causing chronic-infections that lead to an increase in the level of interleukin-6, which increases of pituitary gland disorder and the difficulty of treating infertility and increasing of corona complications.

The ninth article[9], which is related to Covid-19, presents an adherence model for cervical cancer treatment during the Covid-19 era. This non-experimental, cross-sectional, and exploratory study involved a non-probabilistic selection of 104 patients from a public hospital in the State of Mexico. The study constructed a scale of psychosocial variables that determine adherence to cervical uterine cancer treatment. Using a structural model, it demonstrated the adjustment of trajectories in which knowledge influenced adherence behavior. The study acknowledges the limitations in its design, sampling, and analysis, and recommends the inclusion of organizational and psychological variables supported by organizational and personality theories.

The tenth study[10] focused on hepatocellular carcinoma (HCC) in Iraqi patients, aiming to predict and diagnose Hepatitis B and C viral infections early using miR-122 and miR-223. This study sought to determine if serum miRNAs could serve as potential biomarkers for both HCC and HBV and HCV infections.

The study analyzed the expression of miRNA in 64 serum samples through RT-qPCR. It was found that HCC patients' sera exhibited significantly lower levels of miR-122 and miR-223 compared to healthy volunteers. Additionally, a comparison was made between the expression of these miRNAs in early-diagnosed HCC patients and healthy controls. Notably, there was a significant difference in miR-122 expression levels between HCC sera and healthy volunteers' sera (0.000 and 0.253, respectively), with a P-value of <0.0001. Patients diagnosed early and without treatment showed complete depletion of miR-122 expression levels, while those under treatment had slightly elevated levels. This underscores miR-122's role as a biomarker for early HCC detection and treatment monitoring.

Furthermore, both HBV and HCV specimens exhibited significantly lower levels of miRNA compared to normal samples, with a P-value of <0.0001. These findings warrant further investigation for diagnostic purposes. These miRNAs demonstrate high specificity for diagnosing HCC, HBV, and HCV, making them valuable indicators for potential therapeutic interventions.

The eleven article[11] addresses the treatment of *Aspergillus niger* growth isolated from wheat grains using dielectric barrier discharge (DBD) plasma. Microbiological contamination by fungi can significantly impact the quality and safety of stored wheat grains. This Iraqi research aimed to assess the effectiveness of cold plasma in inhibiting the growth of *Aspergillus niger*, a fungus isolated from wheat grains.

A dielectric barrier discharge (DBD) system operating at atmospheric pressure was employed to generate cold plasma, which was

then used to treat the fungus. The study investigated the impact of this treatment over various durations, including 1, 2, 4, 6, and 15 minutes. The results revealed a highly significant decrease in the growth and spore count of *Aspergillus niger* compared to the untreated control samples. This study introduces an efficient technique for improving the storage of wheat grains, which may serve as a valuable foundation for future large-scale investigations dies**.**

The power of strongly coordinated global surveillance and public health measures, coupled with scientific research, to keep infection under control. Therefore, there is a real needing to enhance global resources to investigate, detect and treatment to emerging infections, and to appropriately coordinate and direct research efforts to meet the challenges presented by these diseases which explore into pandemic.

The research work should attend to strengthening health system by improving the disease control strategies, the coordinated

scientific research work with enhancing application for detection, treatment and control on infectious diseases will improve global understanding and improve global capacity in health felid. All these efforts create consortia of scientists that are well managed and work together under commonly agreed objectives.

Still Health community within the whole world needs to know a lot about virus infection, even Antibiotics provide no defense for infectious diseases that are caused by viral agents such as Covid-19, influenza, HIV, herpes, and hepatitis B. In these cases, antiviral medications are the most effective at slowing down the progression of the disease and boosting the immune system but without complete cure. Unfortunately, as with antibiotics treatments, viruses can mutate and become resistant to antiviral drugs. The economic requirements of health and medical Center still weak and needs global support to face any newly pandemic in faster response.

Conflicts of Interest: The authors declare no conflict of interest.

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الافتتاحية: التطورات الحالية في استراتيجيات مكافحة العدوى

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الخلاصة

تناولت هذه الافتتاحية احدى عشر بحثا تم نشرها في عدد خاص عن التطورات الحالية في استراتيجيات مكافحة العدوى . حيث بين احد البحوث كيفية بناء نموذج تنبؤي لمعدل التلف الحاصل في كل جزيء من جزئيات لقاح الرنا المرسل. وتم مقارنة التأثير الكيموحيوي للقاحات الثلاثة المعطاة في العراق و هي : فايزر بايونتيك ، أسترازينيكا أوكسفورد و السينوفارم على متغيرات كيموحيوية. وبينت نتائج دراسة عواقب السارس CoV2 على الجهاز العصبي الحسي بشكل خاص. واوضحت دراسة اخرى تاثير جائحة الكوفيد على انتاجية الكادر الطبي في مختلف الاختصاصات. وبينت دراسة اخرى العلاقة بين COVID-19والمؤشرات الحيوية المختلفة منذ بداية جائحة كورونا بما في ذلك فصائل الدم ABO وD-dimer وFerritin وCRP. وتم تقييم تأثير كوفيد-19على انزيمات الكبد واختبارات الدهون للأشخاص المتعافينمن كوفيد-19. وفي تحليل مقارنة لأقرب k (KNN) ،و Extreme Gradient Boosting (XGboost)،و Support-Vector Machine (SVM)،وهي بعض مناهج التصنيف لاختيار الميزات في هذا المجال باستخدام خوارزمية Moth-Flame Optimization (MFO)،وخوارزمية Gray Wolf Optimizer (GWO) ،وخوارزمية Glowworm Swarm Optimization (GSO). واوضحت دراسة بان السمنة وعدوى فيروس تؤثر سلبا على الاباضة لدى النساء المصابات بالعقم ، بالإضافة إلى التسبب في التهابات مزمنة تؤدي إلى زيادة مستوى البين ابيضاضي   6 مما يؤدي إلى زيادة اضطرابات الغدة النخامية وصعوبة علاج العقم وزيادة مضاعفات كورونا . وتناولت دراسة اخرى سياسات الوقاية من خلال الفحوصات الطبية الخاصة بالصحة الانجابية في المكسيك والتي تظهر نقص الفرص والقدرات في المراكز الصحية في المناطق الريفية. وبينت دراسة بان عينات المصابين بالتهاب الكبد الفيروسي بنوعيه B وC سجلت انخفاضا معنويا بمستويات التعبير الجيني لكلا المؤشرين الحيويين   miR-122,miR-223مقارنة بمجموعة الاصحاء. وبينت دراسة انخفاض معنوي كبير في نمو Aspergillus Niger ، و ايضا عدد الجراثيم مقارنة بالعينات غير المعاملة . واقترحت برنامجا لمحاربة الاصابة بالفطريات في مخازن حبوب الحنطة وبناءا على ما سبق يشكل العدد الخاص اضافة نوعية في ضرورة بناء برامج متخصصة في تشخيص وعلاج ومقاومة الاوبئة بمختلف انواعها وضرورة تعاون الدول في المحيط الافرواسيوي لمواجهة الاوبئة واي جائحة مستقبلية. وتحسين واقع الخدمات الصحية وتاهيل كواردها.

الكلمات المفتاحية : كوفيد 19 , التعلم الآلي ,الخصوبة, السمنة, الانتاجية. صحة المجتمع, اللقاح.