

Comparison between two bitterness predictors using Extended Connectivity Fingerprints (ECFP) and selected physicochemical descriptors

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The aim was to compare the performance of Two Adaptive Boosting ensembles based on ECFP and 16 selected physicochemical descriptors using the F-1 score on an external set of 54 molecules. The training molecules were obtained from BitterDB, SupersweetDB and Fenaroli's handbook of flavor ingredients. The ECFP6-1024bit were created using the RDKit package in an Anaconda environment. The physicochemical descriptors were calculated using the Mordred package. The method for selecting the physicochemical descriptors was mutual information. The Adaboost model was trained using the library scikit-learn. A 5-fold cross validation was used as metric for the fine tuning of the models. Afterwards, the F-1 score on the external was calculated. The model based on ECFP showed a cross-validation accuracy of 0.80. The f1 score on the UNIMI set was 0.71. The model based on physicochemical descriptors showed a cross-validation accuracy of 0.77. The f1 score on the UNIMI set was 0.78. The latter showed that the selected physicochemical descriptors led to a better separation of the bitter/non bitter molecules. The ECFP and the physicochemical descriptors provide different information about the training set and together could provide a better input for bitterness prediction.

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Keywords: In silico, bitter taste, machine learning

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Sunflower and rapeseed cake bioprocessing by fungal consortiums

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Microbial consortiums (MC) occur ubiquity in nature on soils, wastewaters, and food products, and establish synergistic interactions with the surrounding species. These interactions help to overcome individual difficulties regarding nutrients absorption. Two of the major oilseed cakes (OC) produced at a global scale were selected as substrate to be processed by solid-state fermentation by MC of the species *Rhizopus oryzae* (RO), *Aspergillus niger* (AN) and *Aspergillus ibericus* (AI), to produce enzymes and to obtain antioxidant rich aqueous extracts. RO-AI consortium led to the highest cellulase (135 U/g, activity per gram of dry substrate) and β -glucosidase (265 U/g) activity while maximum protease activity of 228 U/g was observed with AN-RO consortium. Xylanase highest production of around 860 U/g was obtained in RSC. MC significantly ($p < 0.05$) increased antioxidant potential of extracts of fermented substrates compared to unfermented ones, evaluated by the reduction potential and the scavenging potential of free radicals and superoxide anion. Microbial fermentation affected the structural composition of OC resulting in lowered content of neutral and acid detergent fibers.

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Keywords: Solid-state fermentation, microbial consortiums, enzymes, antioxidants, crude protein, fiber

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Comparison of siRNA Loading Quantification between Spherical and Serrated Gold Nanoparticles

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siRNAs provide therapy by gene silencing in tumor tissues. However, they are corrupted by enzymes in the bloodstream and get degraded easily. Therefore, siRNAs need a carrier to reach the solid tumor. Nanoparticles have been widely used for siRNA delivery including gold nanoparticles (AuNPs) that have many different shapes such as nanospheres, nanorods, nanostars. AuNPs are largely used in gene delivery effectively thanks to their large surface area, and biocompatibility. Although nucleic acids have been successfully delivered using AuNPs, the effect of the shape and size of these nanoparticles is still not fully understood. To clarify these effects, we also synthesized gold nanocones (AuNCs) having serrated surfaces and large surface area ranging between 100-150 nm sizes by following sonication within two separate liquid phases. Then the surface of AuNCs was modified with siRNAs. The nanostructures were characterized using UV/Vis spectroscopy and NTA analysis. The number of siRNAs per AuNC was evaluated and compared with spherical AuNPs. It was determined that AuNCs loaded siRNAs 1 order of magnitude than the spherical ones, which indicates larger surface area and serrated surfaces are advantageous for AuNP based delivery systems.

Keywords: Gold Nanoparticles, Gold Nanocones, siRNA, Gene Delivery

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Sphingomyelin is essential for infant nutrition

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Epidemiological data suggest Mediterranean diet to have positive roles in maintaining health. This diet includes the use of eggs, milk and dairy products, foods rich in sphingomyelin, a bioactive lipid essential to cell biology and cell fate regulation. During embryonic, fetal and childhood life, organisms progressively acquire physiological functions due to a continuous molecular remodeling and sphingomyelin is involved in this process, specifically in the brain. Interestingly, human breast milk is very rich in sphingomyelin content that was considered as responsible for the acquisition of cognitive abilities. The aim of the study was to investigate the role of sphingomyelin in the embryonic hippocampal cell differentiation. First, by studying cell viability concentration-dependence, we have identified 1.25 μ M sphingomyelin as the optimal dose for the studies. The results highlighted that sphingomyelin was able to stimulate the neurite formation due to the heavy neurofilament protein overexpression. Interestingly, by using a specific protein probe to visualize sphingomyelin (fluorescent lysenin) for different times, we showed that it first localized in the cell membrane, then in the cytosol and finally in the nucleus, supporting our previous data indicating an important role of nuclear sphingomyelin.

Keywords: sphingomyelin, embryonic hippocampal cells, cell differentiation

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The investigation of uniparental disomy and aberrant methylation patterns for chromosomes 6, 7, 14 and 20 in children with syndromic intrauterine growth retardation

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Background: Chromosomes 6, 7, 14, and 20 contain imprinted genes associated with rare intrauterine growth retardation (IUGR) syndromes. The aim of this study was to investigate the presence of uniparental disomy and aberrant methylation patterns at chromosome 6, 7, 14 and 20 in patients with IUGR and syndromic findings.

Method: Thirty three patients that do not have chromosomal anomaly, no deletion/duplication detected by array analysis, no molecular changes at the imprinting control regions at 11p15.5 and no gene mutations that are associated with known IUGR syndromes. Methylation and copy number changes were examined by methylation-specific-multiple ligation probe amplification method (MS-MLPA).

Results: Maternal UPD 7 which is associated with Silver Russell Syndrome (SRS) was detected in one of the patients and his clinic was compatible with SRS. Maternal UPD 14 also known as Temple Syndrome was detected in one of patients and her findings such as typical dysmorphic facies, hypermobility in all joints, small hand, motor retardation and truncal obesity are compatible with the clinic of Temple Syndrome.

Conclusions: These results suggest that applying MS-MLPA assay for imprinted genes in syndromic intrauterine growth retardation and syndromic features is useful in expanding genetic diagnosis.

Keywords: Intrauterine Growth Restriction, Genomic Imprinting, Uniparental Disomy, MS-MLPA

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Playing with the Phenylalanine Residues of Aurein 1.2: The Two, The One and The None

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Antimicrobial peptides (AMPs) could provide an alternative to conventional antibiotics because they induce little or no resistance. Aurein 1.2 is a 13-residue antimicrobial peptide secreted by frog *Litoria aurea*. It acts via permeabilizing bacterial membranes at low micromolar concentrations. However, the molecular details of this process are mostly unknown. There are two aromatic phenylalanine residues of the Aurein 1.2 sequence and there are indications that they facilitate the binding to the bacterial membrane. Here, we used Imaging Fluorescence Correlation Spectroscopy to compare the mechanism of action of wild type peptide versus mutants where the Phe residues were substituted with alanine. This mutation affects binding and the disruption pathway of different lipid model membranes at 1-9 micromolar peptide concentration. The understanding of the mechanism of action of this peptide according to the characteristics of its constituent amino acids provides design rules for drug development.

Keywords: Antimicrobial Peptide, Membrane Disruption, Biomimetic Membrane, Aurein 1.2, Mechanism of Action

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A Preliminary Study of Antibacterial Role of Amoxicillin Imprinted PHEMA Cryogel Discs

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The purpose of controlled drug release is to deliver the drug to the most appropriate part of the body with a therapeutic dose. Cryogels have been introduced as effective materials for antibiotic releasing. Cryogels are synthesized by the formation of a porous structure of ice crystals in a semi-frozen aqueous medium. Interconnected large pores create a spongy and flexible structure. To increase the efficiency of releasing platforms, imprinting technology is promising for the preparation of materials capable of capturing target molecules. Molecular imprinting technology is a synthetic approach that can mimic natural recognizers such as antibodies and biological receptors. Molecularly imprinted cryogels have been widely used for providing slow therapeutic drug release, enhancing the loading capacity, achieving therapeutic release depending on environmental conditions with the advantage of increasing selective loading. In this regard, the present study aimed to prepare and characterize amoxicillin imprinted poly(2-hydroxyethyl methacrylate) (PHEMA) cryogel discs. It was indicated that amoxicillin imprinted PHEMA cryogel discs are applicable for drug-releasing verified by releasing studies. Besides, this preliminary study showed that amoxicillin imprinted PHEMA cryogel discs have antibacterial activity against both Gram positive and Gram negative bacterial strains.

Keywords: Imprinting, Cryogel, Antibiotic, Releasing systems

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Effects of *Helix Aspersa* extract on inflammation in experimental model of Alzheimer's type dementia

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Contemporary hypothesis underlies complex mechanism of the most common form of dementia of Alzheimer's type (ATD) which accounts for 60-80% of dementia cases worldwide. Experimental model of ATD was induced in male Wistar rats by scopolamine (2 mg/kg, i.p, 11 days). Snail extract (SE) was applied orally for 16 consecutive days (5 days before and 11 days simultaneously with scopolamine). Levels of anti-inflammatory cytokine interleukin-10 (IL-10) and the inflammatory tumor necrosis factor alpha (TNF-alpha) in rat serum samples (controls; ATD; ATD + snail extract; snail extract only) were determined. The highest level of the anti-inflammatory cytokine IL-10 was found in the group treated only with snail extract, and the level of this cytokine increased in the group ATD + SE as compared to the group of Alzheimer's type dementia. Level of the inflammatory cytokine TNF-alpha was lowest in the control group and in the one treated with SE, with most inflammatory cytokines observed in rats with Alzheimer's type dementia, which concentration decreased significantly after application of snail extract.

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Keywords: Alzheimer's disease, dementia, snail extract, inflammation, cytokines, *Helix aspersa*

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Role of vitamin D3 in the exosomes release by embryonic hippocampal cells

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Exosomes are essential for cell-cell communication but the action of nutrients on their release is still poorly investigated. It is known that vitamin D3 and sphingolipids play important roles in cell fate, by acting in cell proliferation, differentiation, apoptosis and cancer. The crosstalk between these two nutrients has been recently demonstrated. The aim of the work was to study the effect of vitamin D3 in sphingolipid composition of exosomes. We demonstrated for the first time the presence of neutral sphingomyelinase and vitamin D receptor in exosomes released from embryonic hippocampal cells. Using ultrafast liquid chromatography tandem mass spectrometry, we showed a high content of saturated sphingomyelin species respect to whole cells. Vitamin D3 treatment was responsible for the vitamin D receptor loss, the increase in neutral sphingomyelinase content with consequent decrease of sphingomyelin. As a consequence, a high level of ceramide was produced. Incubation of the cells with neutral sphingomyelinase or ceramide induced embryonic hippocampal cell differentiation, as vitamin D3, by suggesting the possible action of vitamin d3 via exosomes.

Keywords: vitamin D3, exosomes, ceramide

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Involvement of sphingolipid metabolism in the anti-cancer effect of vitamin C

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Vitamin C was suggested to have anticancer properties but its anticancer mechanism has not been elucidated. We investigated for the first time the involvement of sphingolipid metabolism in the human breast cancer cells after treatment with pharmacological doses of vitamin C. We used 0.1mM to 20 mM doses to investigate its effect on cell viability. The results showed no changes after 24hrs of treatment. After 48h treatment, 10 mM vitamin C induced a 75% reduction of cell viability, indicating a specific effect on cell death.

Thus, we used 10 mM vitamin C treatment to investigate the sphingolipid metabolism. Interestingly, vitamin C upregulated sphingomyelin phosphodiesterase 1, encoding for acid sphingomyelinase, and downregulated sphingomyelin phosphodiesterase 4, encoding for neutral sphingomyelinase. This is relevant considering that acid sphingomyelinase is involved in apoptosis by producing ceramide in lysosomes and neutral sphingomyelinase is involved in cell proliferation by producing ceramide in cell and nuclear membranes. Moreover, sphingosine kinases 1 and 2 genes encoding for respective proteins that use ceramide to produce sphingosine-1-phosphate and sphingosine-1-phosphate lyase that degrade sphingosine-1-phosphate were upregulated, by suggesting that the whole sphingomyelin catabolism is activated. Thus, we propose a new mechanism of action of vitamin C in cancer.

Keywords: Vitamin C, breast cancer, acid sphingomyelinase, neutral sphingomyelinase

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Deep Feature Extraction and Early Prediction of Obstructive Sleep Apnea Events

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Obstructive sleep apnea (OSA) is a common sleeping breathing disorder characterized by interruptions in breathing or obstructions in the airway. An early prediction of OSA may help in avoiding the disorder's symptoms by identifying events before they happen. In this regard, we proposed a methodology for OSA prediction using both convolutional neural networks and traditional machine learning approaches. For this purpose, 30-second pre-apnea and non-apnea segments of electrocardiogram (ECG) recordings were extracted for various leading times and 2D scalogram images representing the time-frequency characteristics were generated from each segment. Deep features extracted from scalogram images using a modified residual network were fed separately into a support vector machine and two ensemble classifiers, namely random subspace k-nearest neighbors (kNN) and random subspace discriminant classifiers. The subspace kNN classifier outperformed other classifiers and achieved performance results up to 86,97% accuracy, 88,19% sensitivity, 84,26% specificity, and 85,70% positive predictive value. These results suggest that using machine learning approaches to classify deep features of single lead ECG scalogram images may improve prediction performance. Ultimately, the proposed method can be used as a useful approximation to identify impending OSA events.

Keywords: prediction, obstructive sleep apnea, deep features, convolutional neural networks, ensemble classifiers

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Clinico-laboratory characteristics of pediatric patients with covid-19

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Nowadays's an important issue is to understand more pediatric age patients with COVID-19. In the present study, we investigated some clinical-laboratory characteristics in pediatric COVID-19 patients. Therefore, we studied laboratory-confirmed pediatric patients aged one month to 18 years and diagnosed with lab-confirmed COVID-19 between December 2020 and April 2021. The real-time reverse transcriptase-polymerase chain reaction assay was used for the detection of SARS-CoV-2. We include 150 pediatric patients. In the present study, we include the following: ALT, AST, creatinine, lactate dehydrogenase, and procalcitonin, C-reactive proteins, D-dimer, and ferritin. Notably, the study indicated that the level of aspartate aminotransferase (AST) was 1.39 times high compared to its normal level ($P = 0.007$) in pediatric age patients. Similarly, the other liver enzymes also revealed changes. Interestingly, the D-dimer level was high 2.18 times higher compared to its standard value ($P = 0.015$, respectively). May Elevated liver enzymes also are the upper compared to of normal range. Therefore, we have thought it may use as the prognostic significance, in particular for liver biochemistries.

Keywords: Covid-19, pediatric patients, Liver Function, D-dimer

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Opposite effects of even and odd-numbered long chain fatty acids on expression of myelination related genes in human oligodendrogloma cells

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Multiple sclerosis (MS) is characterized by the loss of myelin sheath in the central nervous system, and long-chain fatty acids are crucial in the myelination process. However, in the literature, the effects of nervonic and pentacosanoic acid (NA, C24:1 and PA, C25, respectively) on the myelination process have not been elucidated. Therefore, we focused on the differential impact of NA, tetracosanoic acid (TA, C24) and PA on myelination related genes (MRGs) expression.

Differentially expressed MRGs [Myelin Basic Protein (MBP); Proteolipid Protein (PLP); 1, 2',3'-Cyclic Nucleotide 3' Phosphodiesterase (CNase); and Myelin Associated Glycoprotein (MAG)] were measured at non-toxic doses of fatty acids on human oligodendrogloma (HOG) cells. Our results showed that MBP (Fold regulation (FR), 1.49 compared to control), PLP1 (FR, 1.81), CNase (FR, 4.2) and MAG (FR, 1.8) mRNA expression levels were significantly induced with NA treatments (EC04). With increased concentration, though even-numbered TA inhibited the MRGs expression, odd-numbered PA treatment increased MRGs expression. Studies are underway to elucidate their effect in detail on myelination via the HOG cells- neuroblastoma cells (SHSY-5Y) co-culture to visualize myelination phenotypically using immunofluorescence microscopy. Thus, preliminary data confers the therapeutic effect of rare odd-numbered fatty acids for MS for the first time in literature.

Keywords: odd/even-numbered fatty acids, myelination, multiple sclerosis

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Optimization of myelination on human cerebral organoids for studying multiple sclerosis (MS)

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MS is characterized by demyelination of the nervous system. Although two-dimensional (2D) culture systems have been used for several years to mimic some disorders or for drug screening or discovery, some of the multifactorial diseases, including MS, are difficult to study in 2D while considering the complexity of the disease. Additionally, reliability of drug studies on 2D models is low. This problem could be solved using in vivo models; however, both ethical issues and some differences between human and rodent brain make it challenging to apply in vivo models for MS. For this purpose, we've tried to create a 3D model to study MS using embryonic stem cells (H1 and H9). During organoids generation, certain growth factors and supplements (basic fibroblast growth factor, vitamin A and platelet-derived growth factor) were added into culture media at different stages of the organoid development. At the further steps of the organoid development, some small molecules (T3 and ketoconazole and their combination) are supplemented to the growth medium to enhance myelination. Currently, we are analyzing our organoids phenotypically using immunohistochemistry. Last but not the least, our results are promising to study MS in 3D culture in the near future. TUBITAK 119Z389 supported this study.

Keywords: cerebral organoids, multiple sclerosis, 3D culture, myelination

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Inspection of different waste materials as prospective laccase production feedstocks

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The most common biomaterial found in the environment is lignocellulose, its renewability and low cost make it an ideal feedstock for a variety of bio-applications. In this work the purpose is to look into a green process that results in the production of lignocellulolytic enzymes, primarily laccases, and the treatment of lignocellulose components. Hence, various local Algerian lignocellulosic materials were evaluated, including alfa stems, olive and tomato pomaces, dry palm leaves, and pinecones. They were selected based on their industrial operability features, quantity, and accessibility. Out of 12 laccase positive strains tested, only the fungal strain *Trametes versicolor* was able to produce laccase by submerged fermentation, on these complex substrates. Indeed, variability in enzyme secretion has been observed depending on the type of substrate used; thus, the best wastes for producing laccase were tomato and olive pomaces and palm leaves waste. The tomato waste-based medium recorded the highest laccase activity of 55.6 U/L, followed by 26,27U/L on palm waste, and 10.56U/L on olive pomace. The preliminary findings show that tomato waste can be optimized to be used as a potential biological resource to produce laccases that oxidize highly recalcitrant environmental pollutants, while also contributing to the biovalorisation of lignocellulosic biomass.

Keywords: Biodegradation, Lignocellulose Biovalorization, Laccase, Fermentation

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Evaluation of possible vertical transmission of SARS-CoV-2 infection during third trimester of pregnancy

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Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) has been proved to be significantly more infectious compared to other strains of the family. During pregnancy, increased risk of having a viral infection has been proven. The aim of this study was to analyse the maternal-fetal vertical transmission of SARS-CoV-2 during third trimester and to evaluate the clinical outcome of SARS-CoV-2 infection during pregnancy.

Nasopharyngeal, vaginal and cord swab samples were obtained from a female patient for SARS-CoV-2 RT-PCR testing. Nasopharyngeal swab sample was obtained from the neonate. Serum samples obtained from peripheral venous blood were tested for COVID-19 IgG and IgM for both mother and the neonate.

The pregnant female tested positive for SARS-CoV-2 and she was admitted to the hospital for emergency cesarean section. The neonate tested negative for SARS-CoV-2 RT-PCR with IgG elevation. The placental and vaginal samples were negative for SARS-CoV-2 and therefore, there was no detection of vertical transmission.

In conclusion, the vertical transmission does not seem to be present in SARS-CoV-2 infected females in the third trimester of the pregnancy. However, it is a possibility that it may possess maternal and fetal complications, such as premature rupture of the membranes.

Keywords: SARS-CoV-2, pregnancy, third trimester, vertical transmission

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Effects of Cigarette Smoking on Sperm Quality and Quantity

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Infertility constitutes a concern in the modern age. It can be caused by genetic, epigenetic or environmental factors. Cigarette addiction comprises a common causative negative factor for general health; however, its effects on infertility remain controversial. This study aims to investigate the effects of smoking in terms of sperm quality and/or quantity which is still debated.

118 couples were included. In smoker group (51 subjects) 87.8% had healthy volume of semen and in the non smoker group this was 85.4% respectively. Sperm concentrations were 82.5% vs. 79.2% respectively. Motility parameters were also comparable; 57.90% versus 54.35% respectively. As for sperm morphology 78.4% of smokers and 70.45% of non-smokers had healthy morphological traits according to latest WHO guidelines. Day 3 embryo development in couples and live birth rates in smokers were 58.5% of embryos were among the highest quality, 20.3% were among second highest quality and 17% were grade 3 embryos. For non-smoker patients the ratios were 50.45%, 27.05% and 17.5% respectively. Live birth rates were 33.3% for smokers and 37.31% for non-smokers with. Our analyses showed that sperm quality and/or quantity are not affected by cigarette smoking.

Keywords: IVF, sperm quality, sperm quantity, cigarette smoking, pregnancy

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SARS-CoV-2 Alpha Variant Infection After Inactive Vaccine

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Coronavirus disease has been an on-going major healthcare problem since the emergence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Several vaccines against wild type SARS-CoV-2 have been developed; however, their efficacy against different variants remains a big concern.

This case study presents a female health-care worker who was administered two doses of inactive SARS-CoV-2 CoronaVac vaccine and detected as SARS-CoV-2 positive by RT-PCR testing after detection of a SARS-CoV-2 positive case in her. She was taken to the government allocated quarantine site with her family. Her RT-PCR test in quarantine was reported to be positive for SARS-CoV-2, 5 weeks after second dose of her vaccination. The nasopharyngeal swab RNA was further analyzed for N501Y mutation.

The collected data indicated that, she was exposed to viral load for 6 days in a quarantine site without any social distance with SARS-CoV-2 positive individual. The mutation analysis of the virus was reported to be N501Y positive (Alpha variant) known for a higher transmission rate than wild-type SARS-CoV-2.

In conclusion, SARS-CoV-2 Alpha variant might be transmitted to double dose inactive vaccinated individuals if there is a direct, prolonged contact with an infected individual when no social distance and protective measures are applied.

Keywords: SARS-CoV-2, N501Y, Inactive vaccine, CoronaVac, Alpha variant

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Evaluating of the Test Performance of Antigen Diagnostic Tests for SARS-CoV -2 by Using Multi-criteria Decision-Making Theory

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Antigen tests help rapid diagnosis of active infection by detecting the presence of viral proteins expressed by individuals infected with SARS-CoV-2. The study evaluated the test performances of the FDA EUA Authorized SARS-CoV-2 antigen tests that are designed for clinical management of suspected cases. The study was carried out by evaluating different criteria of 28 antigen diagnostic tests, including predominantly lateral flow testing and fewer immunoassays for SARS-CoV-2, using multi-criteria decision making (MCDM) theory. The criteria used in the analysis included a limit of detection, positive and negative percent agreement, point of care testing, specimen type, test technique, antigen target, result time, sampling days post symptom onset, reagent storage conditions, practicability, etc. The results showed that Clip COVID Rapid Antigen Test was the most favorable test, followed by Sofia 2 Flu + SARS Antigen FIA, BD Veritor System for Rapid Detection of SARS-CoV-2 while, The VITROS Immunodiagnostic Products SARS-CoV-2 Antigen Reagent Pack was the least representative of the expected test performance. Fuzzy PROMETHEE and VIKOR techniques can be applied in aiding decision-makers in choosing the right antigen test for the rapid diagnosis of cases and the management of COVID-19

Keywords: SARS-CoV-2, antigen test, COVID-19, Fuzzy PROMETHEE, VIKOR, MCDM

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Ranking of Diagnostic SARS-CoV -2 IgG Antibody Tests by Using Multi-criteria Decision-Making Theory

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Many different serological tests have been developing to support healthcare workers to identify individuals who may have developed an adaptive immune response to SARS-CoV-2. The study aimed to evaluate the test performances of the FDA EUA Authorized SARS-CoV-2 IgG antibody tests that are currently being used in coronavirus disease 2019 management. The study was carried out by evaluating different criteria of 48 SARS-CoV-2 IgG antibody tests involving of rapid diagnostic tests, plate-based tests and immunoassays, using multi-criteria decision making (MCDM) theory. While comparing the antibody tests, main criteria such as analytic sensitivity, specificity, positive predictive value, negative predictive value, specimen type, test technique, antigen target, time to first result, time of sampling days post infection, reagent storage conditions, practicability, etc. were assessed and used for determining the ranking of tests. The results showed that, Siemens ADVIA Centaur SARS-CoV-2 IgG (Cov2G) was the most representative of expected test performance, followed by QUANTA Flash SARS-CoV-2 IgG, Siemens Dimension Vista SARS-CoV-2 IgG (Cov2G), while Euroimmun anti- SARS-CoV-2 ELISA (IgG) was the least favorable one. Fuzzy PROMETHEE techniques can be applied in aiding decision-makers in choosing the right antibody test for the management of COVID-19.

Keywords: SARS-CoV-2 Ig G, COVID-19, Fuzzy PROMETHEE, MCDM

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Comparative Evaluation of SARS-CoV- 2 IgM Antibody Tests by Multi-criteria Decision-Making Strategy

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Antibody testing is an important and useful tool as a complementary approach to the reverse transcriptase-polymerase chain reaction test in identifying individuals infected with SARS-CoV-2. This study aimed to evaluate the test performances of SARS-CoV-2 IgM antibody tests authorized by FDA. The study was carried out by evaluating different criteria of 27 SARS-CoV-2 IgM antibody tests involving of lateral flow assay and immunoassays, using multi-criteria decision making (MCDM) theory. The criteria used for the analysis included analytic sensitivity, specificity, positive predictive value, negative predictive value, specimen type, test technique, antigen target, time to the first result, time of sampling days post infection, reagent storage conditions, practicability, etc. The results showed that, Innovita 2019-nCoV Ab Test (colloidal gold) was the most representative of expected test performance, followed by Cellex qSARS-CoV-2 IgG/IgM Rapid Test and Assure COVID-19 IgG/IgM Rapid Test Device, while InBios- SCoV 2 Detect IgM ELISA Rapid Test Kit was the least favorable one. Fuzzy PROMETHEE technique can be applied in aiding decision-makers in choosing the right antibody test for the management of COVID-19.

Keywords: SARS-CoV-2 IgM, COVID-19, Fuzzy PROMETHEE, MCDM

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Comparison of the Rapid Antigen Test and RT-PCR in the Diagnosis of SARS-CoV-2: A Single-Center Experience

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The COVID-19 pandemic, caused by SARS-CoV-2, is an unprecedented public health crisis. Antigen-detecting rapid diagnostic tests (Ag-RDTs) are available for the diagnosis of SARS-CoV-2 as an alternative to RT-PCR testing. The aim of this study was to determine the accuracy of the SARS-CoV-2 antigen test in comparison to RT-PCR which represents the gold standard. Ag-RDT were performed on 357 nasopharyngeal samples obtained from subjects as routine screening. Further testing was performed by RT-PCR from subjects who were Ag-RDT positive. In the second phase, Ag-RDTs were applied to 75 subjects, who were confirmed as positive by double RT-PCR testing (Figure 1). Fourteen out of 357 subjects were tested positive by Ag-RDT. The RT-PCR results of all these 14 patients were negative (false positivity rate: 3.9%). While 51 (68%) of 75 SARS-CoV-2 RNA positive samples were antigen positive, 24 (32%) were negative. The false negativity rate of the antigen test in patients with a low viral load (CT: >30) was 83.3 (Table 1). The sensitivity and specificity of the Ag-RDT kit were 68.0% and 96.1%, respectively (Table 2). Collectively, it has been observed that the use of antigen-based tests in the diagnosis of SARS-CoV-2 can increase false negative results in clinical practice.

Keywords: COVID-19, SARS-CoV-2, rapid antigen test, RT-PCR, false negative

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Respiratory viral co-infections among SARS-CoV-2 cases in Northern Cyprus

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Accumulating evidence supports the high prevalence of co-infections among severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) patients, and their potential to worsen the clinical outcome of COVID-19. However, there are limited data on the epidemiology of respiratory co-infections in the Cypriot population. The aim of this study was to assess the frequency of respiratory viral co-infections among SARS-CoV-2 patients in Cyprus via molecular testing.

Nasopharyngeal swabs of 65 SARS-CoV-2-positive cases obtained in December-February 2021 were subjected to nucleic acid isolation and molecular screening. Real-time PCR analysis was performed using the FTD Respiratory Pathogens 21 Panel RT-PCR Kit which detects influenza A, influenza A-H1N1, influenza B, rhinovirus, coronavirus NL63, 229E, OC43, HKU1, parainfluenza 1-4, human metapneumovirus A/B, bocavirus, respiratory syncytial virus A/B, adenovirus, enterovirus, parechovirus and *Mycoplasma pneumoniae*. Positive results were further confirmed by QIAstat-Dx™ Respiratory Panel.

Among 65 SARS-CoV-2 patients, 4.6% of cases were co-infected. Interestingly, one patient (1.5%) was detected to be co-infected with parainfluenza virus 4 and bocavirus. Two patients were co-infected with rhinovirus (3.1%). Our results highlight the importance of assessing all pathogens in symptomatic patients. Simultaneous identification of respiratory co-infections in SARS-CoV-2 positive patients offer the possibility of implementing optimized treatment regimens preventing morbidity and mortality.

Keywords: SARS-CoV-2, COVID-19, co-infections, pandemic

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Use of a Kiosk-Model Self-Triage System for COVID-19 Triage

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Background And Aim

- Kiosks are used today in places with high human density such as shopping malls, city centre squares, airports and hospitals to make people's lives easier
- Kiosks in hospitals provide patients applying to health entities for patient recording and admission procedures quickly without waiting in queues
- Needs for health services increase during pandemic periods
- A high patient load occurs during pandemics and health services may become inadequate to meet such patient loads
- While providing service to patients during pandemics, intensive patient-patient and patient-physician contact cause quick spread of disease among people. During pandemic periods, it's necessary to minimize individual contacts, especially in hospitals.
- Frontline health-care workers (HCW) are at high risk of exposure during patient triage in emergency department (ED). Facilitating the triage process is the key in improving triage. We aimed to evaluate the feasibility and benefits of a self-kiosk triage as compared to routine triage procedures.

Material – Methods

- Patients suspected of having COVID-19 aged ≥ 18 years admitted to Bursa Uludağ University ED willing to participate were recruited. Institutional ethical committee approval was obtained.
- All of the patients first completed self-kiosk triage (SKT) by Pandemic Mobile Intelligent Kiosk (PANDEMIK®) and then proceeded to routine triage (RT) procedures (Figure -1).
- A 5-item questionnaire assessed how the patients perceived the feasibility of the self-kiosk by a 5-point Likert scale. Sociodemographic features, comorbid conditions and symptoms were recorded..
- Body temperature and blood oxygen saturation were measured by an infrared thermograph and pulse oximeter replaced in the kiosk, respectively. Total exposure time in both procedures and number of HCWs exposed to patients were recorded

Results

- The final sample included 115 patients (F/M:60/55) with 32.54 ± 10.84 years of age. 25 % of the patients enrolled were PCR +, whereas rest of them were PCR (-).
- The most common symptoms recorded were sore throat, myalgia and cough (60%, 55.7% and 47% of the study population, respectively) followed by dyspnea (19.1%), fever (16.5%), anosmia (13%), taste loss (9.6%) and diarrhea (9.6%). Total exposure time in the self-triage kiosk was significantly shorter than in the routine triage procedure (2.92 ± 1.07 minutes vs. 9.12 ± 4.31 minutes, $p < 0.0001$). Number of exposed HCWs were lower in kiosk triage than in the routine triage procedure (0.31 ± 0.47 vs. 2.41 ± 0.52 , $p < 0.0001$).
- Hypoxia ($SpO_2 < 94\%$) evaluated by self-triage kiosk and HCW were comparable (5.2% vs 2.6%, $p = 0.150$), whereas self-triage kiosk determined high fever less than HCW assessment (0.9% vs. 1.7%, $p = 0.017$).
- Mean scores of the patient assessment scores ranged from 3.11 ± 1.30 to 3.41 ± 1.08 . 80.0% of the participants were able to complete the self-triage independently.

Conclusion

- Pandemic Mobile Intelligent Kiosk (PANDEMIK®) self-kiosk triage enabled users to provide basic medical data quickly in an ED setting.
- Self-kiosk triage is promising for fastening patient triage and reducing health care-workers' exposure to potentially contagious patients especially in situations that cause where overflow of the health capacity such as pandemic.
- Patient feedback for self-kiosk triage is highly positive. Thermometry measurements are prone to improvement

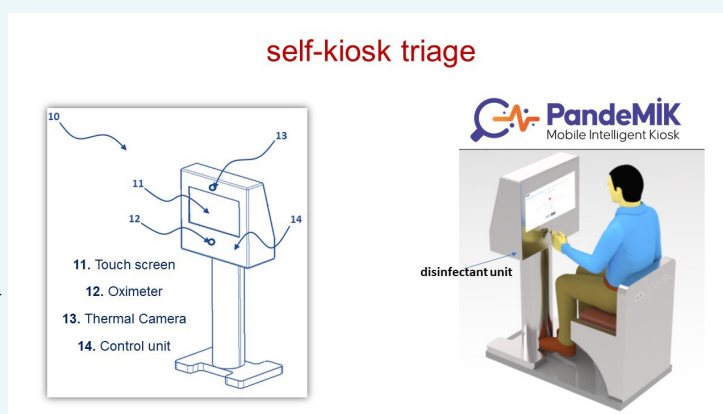


Figure 1. Self-kiosk triage description

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