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Basic Sciences Abstracts

1: Utilizing a Bioinformatic Approach for Identifying New G Protein Coupled Receptor Kinase 5 Interacting Proteins- What Can We Learn from What is Known?

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Purpose

In addition to phosphorylating activated forms of G protein coupled receptors (GPCRs) leading to their desensitization, G protein coupled receptor kinase 5 (GRK5) can also phosphorylate some non-GPCRs, with these protein-protein interactions playing many roles in a variety of diseases. Identifying what other proteins GRK5 can additionally phosphorylate and interact with could be important since this protein kinase is involved in the development of a number of diseases. In this study, we attempt to identify new GRK5 phosphorylation substrates by identifying common features of known GRK5 substrates to come up with consensus amino acid sequences and characteristics that would be used to query for new proteins using bioinformatic tools.

Methods

We used bioinformatic databases (Uniprot, Phosida) and BLAST-P from NIH as well as the phosphorylation site predictor GPS (2.1, 3.0, 5.0). We utilized GPS to identify the best and worst GRK5 substrates. The sequences of the best predicted GRK5 phosphorylation sites were aligned with those of known GRK5 phosphorylation sites and a consensus sequence was predicted. This was then used in BLAST-P searches to identify proteins. In addition, common post-translational modifications of the best GRK5 substrates were identified using bioinformatic resources. We also did this for the identified proteins from BLAST-P searches.

Results

Using this approach, a number of potentially good GRK5 substrates were discovered, with some potentially having a high possibility of being a better GRK5 substrate based on their post-translational modifications. Of interest, some established GRK substrates were deemed to be better GRK5 substrates than others by analysis with GPS. Some contain certain post-translational modifications that could make them better substrates, although no consistent modification was observed. Doing BLAST-P searches on the consensus amino acid sequence, some candidates were identified, with some unique post-translational modifications that may better make them GRK5 phosphorylation substrates.

Conclusions

In this study, we sought to identify GRK5 substrates using bioinformatic approaches. Overall, our preliminary attempt showed that maybe we can identify new GRK5 substrates by using what is known about previously established GRK-interacting proteins. For example, a number of proteins were identified that matched our consensus amino acid sequences entered, with some being better matches than others. This suggests that using this approach may help us identify potential GRK5-interacting proteins, which will help us determine the importance of GRK5 in disorders associated with their various interacting proteins.

2: Evaluation of Remineralization of White Spot Lesions with Quercetin Nanoparticles

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Purpose

One of the most common side effects of orthodontic treatment is the development of white spot lesions (WSL's). WSL's are areas on the tooth surface where there has been degradation of the outer layers of enamel. This degradation is due to demineralization caused by extended periods of plaque buildup. This results in an unsightly, opaque and chalky white lesion on the tooth surface that is difficult to reverse with currently available products. Currently, many new bioactive compounds are under investigation for treatment and prevention of WSL's. One class of such compounds are referred to as flavonoids, which are phytochemicals (plant-derived plant chemicals forming plant pigments), found in almost all fruits, vegetables, and beverages such as tea and wine. Our research project will be looking at one flavonoid in nanoparticle form- Quercetin. The Overall Objective of this research project is to evaluate the remineralization potential of Quercetin nanoparticles as a remineralizing agent for the treatment of WSLs. We hypothesize that quercetin nanoparticles can serve as biotemplates for remineralization of artificial WSLs on extracted human teeth. Quercetin has been investigated for WSL re-mineralization before, but not in nano-particle form. We hypothesize that by reducing the typically microscale (10-6 m) particles to the nanoscale (10-9 m), there will be the possibility of higher density of nanoparticle deposition (and therefore remineralization potential), as well as penetrate into deeper layers of the enamel due to the smaller sized particles more easily passing through the layers of enamel.

Methods

We used SEM and a nanoparticle size analyzer to study synthesized Quercetin size and structure. We will measure the re-mineralization success on the enamel using a Vicker's surface microhardness tester, and Quantitative Light-induced Fluorescence (QLF).

Results

Thus far, we have successfully fabricated Quercetin nanoparticles, tested their size distribution, and analyzed the particles with SEM analysis. We found The average size of Quercetin NPs in suspension when measured with the Zetasizer Nanoparticle analyzer was 678.9 nm (Fig. 1). Further SEM analysis of NPs showed that the QNPs were rod shaped with length ranging from 500nm to 700nm and width of 162nm. The next steps in the project will be to create artificially induced white spot lesions on extracted human teeth, and treat the lesions with Quercetin nanoparticles.

Conclusions

In progress study, no conclusions at this time.

3: Using *Caenorhabditis Elegans* as an Experimental Model to Test the Importance of G protein Coupled Receptor Kinases in Controlling Reactions and Recovery from Hyperosmotic Stress

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Purpose

Hyperosmotic stress from high salt environments is associated with many diseases and how the body can react and cope with it is important to determine the well-being of the individual. Certain proteins play critical roles in helping the body deal with this stress, making sure the cells survive and recover from the stress. In this report, we explored the effect of G protein coupled receptor kinases (GRKs) in modifying reactions to high salt environments using the nematode *Caenorhabditis (C.) elegans*.

Methods

Different GRK strains of young adult *C. elegans* (wild type N2, GRK1, GRK2 and dual GRK1-GRK2 knockouts) were exposed to different concentrations of NaCl and their recovery was probed afterwards, looking at animal responsiveness and egg laying. Briefly, *C. elegans* were exposed to 400-500 mM NaCl for 18 hours and their responsiveness after poking with a platinum rod was recorded. Animals were then moved back to 50 mM NaCl- the concentration of NaCl in maintenance plates- and their responsiveness was probed 1 day later to assess recovery. Recovered animals were then moved to a new 50 mM NaCl plate and egg laying was assessed 2 days later.

Results

Mutant *C. elegans* without GRK1 or GRK2 showed increased resistance to NaCl stress and both showed an increased ability to recover and lay eggs post stress. Compared to the wild type N2 animals, the GRK1 and GRK2 null animals were more responsive within the 500 mM NaCl concentrations. More recovery was observed also from GRK1 and GRK2 null animals, with more animals showing more responsiveness when animals were moved away from the high 500 mM NaCl concentrations. These recovered GRK1 or GRK2 null animals also laid more eggs compared to the recovered N2 wild type animals.

Conclusions

The results in this report demonstrate that *C. elegans* GRKs are involved in hyperosmotic stress reactions. Animals lacking GRK1 or GRK2 showed a better propensity to withstand high salt stresses compared to the N2 wild type animals. Furthermore, these animals also recovered from the stress better, as demonstrated by their increased responsiveness post- treatment and ability to lay eggs as mature adults compared to N2 wild type animals. This implies that the protein levels of GRKs may be clinically important in determining how cells can cope with hyperosmotic stresses associated with diseases.

4: Exploring Doxorubicin Effects on Mitogen-activated Protein Kinase Activity in Human Cardiomyocytes

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Purpose

It is currently unclear what the exact mechanisms are involved with the chemotherapy agent, doxorubicin, and its induced cardiotoxicity. One of the major adverse effects of doxorubicin is direct damage to the heart muscle, limiting its lifetime dose for treatment. The mitogen-activated protein kinase (MAPK) pathway is one of the signaling pathways involved in cardiac hypertrophy and heart failure. In this study, we explore the effects of doxorubicin on the MAPK pathway in cardiomyocytes.

Methods

Primary human cardiomyocytes were treated with 100 nM of doxorubicin for 24 hours with a recovery time of 24 hours. MAPK activity was probed with phospho-ERK (T202) and phospho-MEK (T217) antibodies on cell lysates derived from the cells collected. Western blot analysis and densitometry were used to analyze the data. Bioinformatics information from CTDBase (<https://CTDBase.org>) and STRING (<https://string-db.org>) databases were used to determine common genes related to doxorubicin, ERK2 (MAPK1), and drugs to treat heart failure.

Results

We found that doxorubicin increased ERK activity and then returned to normal when doxorubicin was removed. The phosphorylation of ERK significantly increased 2-fold. Then, we found doxorubicin bypasses MEK activation, which shows no change in MEK phosphorylation after doxorubicin treatment. Genes associated with drugs used for heart failure that directly target receptors in the heart share a higher percentage of convergence to doxorubicin- and ERK2- regulated genes than compared to drugs that indirectly treat heart failure.

Conclusions

Doxorubicin bypasses MEK activity, which is a step above ERK within the pathway, and directly phosphorylates ERK. The significance of doxorubicin activating ERK suggests this could be a mechanism associated with cardiotoxicity. More studies along this pathway are warranted.

5: Exploring the Role of G Protein Coupled Receptor Kinases in Mediating Serotonin and Fluoxetine Effects Using *Caenorhabditis elegans* as an Experimental Model

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Purpose

At this time, how G Protein Coupled Receptor Kinases (GRKs) play a role in the serotonin system is unknown. Determining the effects of GRK1 and GRK2, which are homologs of GRK5 and GRK2 respectively in humans, when exposed to serotonin and fluoxetine can help us better understand how under-expression of these GRKs can affect patients from a clinical standpoint. In this study, we used the invertebrate *Caenorhabditis* (*C.*) *elegans* N2 wild type animals and animals with GRK1 or GRK2 knocked out as an experimental model in determining how the animal behaves when exposed to serotonin and fluoxetine.

Methods

C. elegans was used as an experimental model to study the role of G Protein Coupled Receptor Kinases (GRKs) in mediating serotonin and fluoxetine. The *C. elegans* were exposed to different concentrations of serotonin (0, 5 mM, and 10 mM) for 24 hours before their eggs laid + larvae were counted. The *C. elegans* were then moved to an agar plate with or without 10 μ M fluoxetine for a 24-hour period before their eggs laid + larvae were counted again. Using literature search and STRING, 30 potential GRK substrates were first identified then evaluated using Group-Based Prediction System (GPS) 2.1, 3.0, and 5.0 and the top five proteins most likely to be phosphorylated were identified.

Results

The different strains of *C. elegans* lacking GRKs provided us with varying results. After a 24-hour exposure to different concentrations of exogenous serotonin, the N2 wild types respond very well, as do the GRK1 KOs but significantly less. On the other hand, GRK2 KOs exhibit significantly decreased egg-laying as the concentration of serotonin increases. After being transferred onto a plate with no serotonin, the N2 wild type animals go through a withdrawal period, as do the GRK1 KOs but less so. However, the GRK2 KOs do not go through withdrawal. Instead, they showed baseline egg laying characteristics. For the animals that were moved to a plate with 10 μ M fluoxetine after a 24-hour exposure to different concentrations of serotonin, the N2 wild types and the GRK1 KOs do not go through a withdrawal period as fluoxetine compensates for the lack of exogenous serotonin. The GRK2 KOs that had previously been exposed to 10 mM of serotonin, unlike the others, showed a significant decrease in egg-laying under these conditions. These varying effects may be because of potential differences of GRK1 and GRK2 to phosphorylate known serotonin-modulating proteins in *C. elegans* according to our GPS results.

Conclusions

We assessed that the egg-laying behavior of *C. elegans* with or without certain GRKs after exposure to different concentrations of serotonin varied in our treatment scenarios. Therefore, from these studies, we can predict that, in humans, increasing concentrations of exogenous serotonin in patients with low levels of GRK5 in their brains (GRK1 in *C. elegans*) may not help as much as lower concentrations. In patients with low levels of GRK2 (homolog is GRK2 in *C. elegans*), exogenous serotonin could actually harm the patient and worsen their condition. Therefore, this suggests that GRKs play an important role in serotonin-related diseases.

6: Efforts to increase the ketamine-like activity of the rapid-acting antidepressant RO-25-6981 (MI-4) by increasing AMPA potentiation

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Purpose

Previous studies have shown that the small molecule RO-25-6981 (MI-4) demonstrates antidepressant activity with both a ketamine-like activity and a reuptake inhibitor activity. We have been studying analogs of MI-4 to explore its mechanism of action. Recent publications have shown a significant role of AMPA receptors in the ketamine antidepressant response. Ketamine or ketamine metabolites appear to function as AMPA potentiators. Through examining known AMPA potentiators, we wanted to increase the ketamine-like effect in our previously described analogs.

Methods

We previously reported two analogs (TR-2 and TR-5) of MI-4 which have shown in vivo activity in the anti-depression models in mice. Using molecular overlays and analysis of pharmacophores of these analogs and known AMPA potentiators, we identified a key hydrogen bond acceptor that was missing in MI-4 and analogs. We designed and synthesized molecules that contained this hydrogen bond acceptor. These molecules were assayed for monoamine transporter activity in HEK293 cells which were grown to express these transporters. These molecules will be studied further in vivo using models of depression in mice.

Results

We identified that by changing the phenol group in MI-4 and analogs to a methylenedioxy group, we were able to obtain good steric and electrostatic overlays with both TAK-137, a known AMPA potentiator, and paroxetine, an SSRI. The molecules were synthesized by making the respective amides and reducing them to the desired amines. Biological results are currently pending.

Conclusions

Pending

7: Identifying New G Protein Coupled Receptor Kinase 6 Substrates among Proteins Closely Linked to Prognoses of Pancreatic Cancer

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Purpose

G protein coupled receptor kinases (GRKs), in addition to playing important roles in controlling the activity of drug receptors, may also modulate the activity of non-receptor proteins involved in cancer development. The identification of these protein-protein interactions may provide important clues as to how these associations may lead to the development of cancers and, therefore, how best to treat them. In this study, we sought to identify if GRK6 can interact with various proteins associated with negative or positive prognosis of pancreatic cancer and, if there are connections, what this may mean in terms of their effect on biological and molecular activities.

Methods

In this study, the phosphorylation site predictors phosphonet (phosphonet.ca) and GPS (versions 3.0 and 5.0) were utilized to determine if GRK6 is predicted to phosphorylate the top 20 proteins found to be most associated with negative or positive prognosis according to proteinatlas.org. For the top 6 proteins identified to be the most likely proteins phosphorylated by GRK6 by these tools, their biological functions associated with their gene ontology, obtained from DAVID bioinformatics resources 6.8 (<https://david.ncifcrf.gov/>), were collected and word clouds generated (using www.wordcloud.com) to determine common trends associated with these top 6 proteins. Furthermore, common words, bigrams and trigrams were obtained from this list of biological functions using [databasic.io](https://databasic.io/en/wordcounter/) (<https://databasic.io/en/wordcounter/>).

Results

In this study, we found that a number of proteins from the negative or positive prognosis lists were predicted to more likely be GRK6 substrates compared to others, suggesting a potential specificity for GRK6- protein interactions among proteins most likely to be linked to cancer prognosis. Biologically, the top 6 proteins associated with negative prognosis and GRK6 were more associated with cell signaling events whereas, for positive prognosis and GRK6, more were associated with DNA transcription. This was also reflected in the common words, bigrams and trigrams found in the list of biological functions associated with negative prognosis versus positive prognosis.

Conclusions

This study identified potential GRK6 substrates among the list of proteins most likely associated with either negative or positive prognosis of pancreatic cancer. This study showed that the proteins associated with negative prognosis and GRK6 the best were affiliated more with cell signaling whereas those best associated with positive prognosis and GRK6 were linked to DNA transcription. Overall, these results show that GRK6, if involved in the development of pancreatic cancer, could play different roles depending on if the pancreatic cancer has a positive or a negative prognosis. This may suggest that GRK6 could potentially be a key biological marker to determine the appropriate pancreatic cancer therapy.

8: Exploring the Effects of G Protein Coupled Receptor Kinase 2 and Beta Arrestin 2 on the Efficacy of the TAC Regimen

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Purpose

The efficacy of various chemotherapeutics may be predicted by biomarkers, whose protein expressions may be increased or decreased in certain cancers. Recently, it was shown that doxorubicin sensitivity may be predicted by the expression of beta arrestin 2 and G protein coupled receptor kinase 2. It is unclear though if these proteins can modify the sensitivity of the breast cancer cells to the TAC regimen (Paclitaxel/Docetaxol (T)- Doxorubicin (A)- Cyclophosphamide (C)). In this study, we study the effects of the TAC regimen in a triple negative breast cancer cell line, MDA MB 231, with or with low levels of beta arrestin 2 or G protein coupled receptor kinase 2.

Methods

Herein, we studied the effects of TAC (paclitaxel or docetaxel, doxorubin and cyclophosphamide) on cells stably transfected with shRNA encoding for scrambled sequence (control), GRK2 or Beta arrestin 2. Control, GRK2 or beta arrestin 2 cells were treated with TAC at different times (0-72 hours) and their cell death were assessed by trypan blue exclusion. Furthermore, the effect of paclitaxel versus docetaxel was assessed in combination with doxorubicin and cyclophosphamide in regard to their ability to mediate cell death. The extents of cell death for all experiments were compared by student t-test using graphpad prism.

Results

The effect of the TAC regimen, either with docetaxel or paclitaxel, varied if the breast cancer cells lacked GRK2 or beta arrestin 2. Cancer cells lacking GRK2 showed increased resistance to TAC whereas cells lacking beta arrestin 2 showed increased resistance to TAC. Cell death increased time dependently in both cases. This was not different if paclitaxel or docetaxol was used with doxorubicin and cyclophosphamide. However, docetaxel combinations did show an increase in cell death compared to paclitaxel combinations.

Conclusions

In this study, we saw differences in reaction to TAC if cells lacked GRK2 or Beta arrestin 2. Cells lacking GRK2 showed increased resistance to TAC, unlike cells lacking beta arrestin2, which showed in increase in sensitivity. This suggests that, depending on what the cell is missing, their ability to withstand the TAC regimen can vary, with some leading to increased resistance, as in the case of GRK2. This may mean that GRK2 could be an important biomarker that, if expression is low, could lead to less success with the TAC regimen in treating triple negative breast cancers.

9: Soft tissues Abnormalities in Trisomy 21

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Purpose

Trisomy 21 is considered the most common genetic cause of mental disorders. It happens in 1 in every 700 live births across different populations. Almost 90% of all cases of trisomy 21 involve an extra maternal chromosome. Apart from causing mental retardation, trisomy 21 is closely associated with more than 80 clinical characteristics, such as congenital atresia, muscle hypotonia, and raised risk of leukemia in children among others. The condition is highly associated with facial and soft tissue abnormalities that can include an enlarged tongue, face, skin infections, and gingivitis. The purpose of this review is to further explore the soft tissue abnormalities found within trisomy 21 affecting oral health.

Methods

The bibliographic literature search strategy was used for the literature review. PubMed was the electronic bibliographic database used. The references list from the selected sources was reviewed as well. Keywords were used for the search of relevant sources from the database. Some of the key words included trisomy 21, downs syndrome, facial and soft tissue abnormalities, gingivitis, enlarged tongue, enlarged face, and skin infections.

Results

The research identified a total of 400 studies from PubMed. However, upon eliminating the duplicate studies, only 220 remained for further scrutiny. Upon full review and scrutiny, only 15 (n=15) studies were incorporated for the inclusion review. All 15 (n=15) had relevant information that could be used to understand trisomy 21, especially on facial and soft tissue abnormalities. No country-specific study was selected or used as criteria for selection.

Conclusions

The current literature review depicts that trisomy 21 is related to various conditions, including facial and soft tissue abnormalities. The literature review concentrated on these conditions as many studies have generalized the impacts to a few categories. The fact is that trisomy 21 is related to many disorders, and concentrating on a single one would help highlight various manifestations.

10: Comfort Level of Cleft Lip and Palate Treatment by Recently Graduated Orthodontists

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Purpose

The aim of this study is to determine the comfort level of Cleft Lip and Palate (CL/CP) treatment by recently graduated orthodontic residents. A combination of clinical and/or didactic training in CL/CP should be a part of the core curriculum of CODA-accredited orthodontic residencies across the United States – as such, orthodontic graduates are expected to have some level of experience in management of CL/CP patients. A short survey relating to Cleft Lip and Palate treatment will be sent out to recent graduates by e-mail through the American Association of Orthodontists (AAO) Partners in Research program. Results will be analyzed and calculated using the Statistical Package for the Social Sciences (SPSS) Version 28. The survey has the potential to shed light on the current state of training or experience concerning CL/CP patients in orthodontic residencies in the United States.

Methods

The study is a cross-sectional descriptive questionnaire carried out among recent orthodontic graduates from across the United States. The questionnaires are accessed electronically through a secure online survey platform, Qualtrics (www.qualtrics.com), and the link is to be sent to respondents' personal e-mails. The study was approved by the Roseman University of Health Sciences Institutional Review Board. The questionnaire was reviewed and approved by the American Association of Orthodontists (AAO) Partners in Research program. The link for the questionnaire and a cover letter explaining the objectives will be distributed to all current U.S. AAO members who are considered new-practicing orthodontists. A reminder e-mail will be sent after 2 weeks and the survey data will be collected over the span of 2 months. The collected data will be analyzed with IBM SPSS Version 28. Active U.S. orthodontists that are current members of AAO and are considered new-practicing orthodontists will be included in the analysis – in this case, new-practicing orthodontists are considered to have graduated from a U.S. accredited orthodontic residency within the last 10 years. Retired orthodontists, orthodontic residents, and current practicing orthodontists with more than 10 years of experience are excluded from the study.

Results

NA

Conclusions

NA

11: Exploring the Role of G Protein Coupled Receptor Kinases in Modulating Behaviors to Fluoxetine Using Caenorhabditis Elegans as an Experimental Model

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Purpose

It is currently unclear as to how protein kinases that modulate serotonin receptor activity, like the G protein coupled receptor kinases (GRKs), can influence the effects of selective serotonin reuptake inhibitors like fluoxetine. Addressing this issue may be of clinical importance because the protein expression levels of some of these kinases may vary depending on different disorders, like depression. In this study, we utilized the nematode, *Caenorhabditis (C.) Elegans*, with and without key G protein coupled receptor kinases to determine how *C. elegans* behaviors vary upon fluoxetine treatments.

Methods

C. elegans was treated with fluoxetine or other serotonin reuptake inhibitors and the resulting egg laying and thrashing behaviors were examined. For egg laying, adult *C. elegans* were treated for 24 hours with fluoxetine and egg laying during this period was recorded for *C. elegans* without GRK1, GRK2 or both GRK1 and GRK2. For thrashing, *C. elegans* were observed in M9 buffer with or without fluoxetine treatment for 15 minutes. One body flick was determined to be 1 thrash. Thrashing was recorded as thrashes per second and recorded for 30 seconds.

Results

C. elegans without GRK2 were found to exhibit different egg laying patterns in response to fluoxetine as well as a different thrashing behavior. Adult *C. elegans* without GRK2 treated with fluoxetine did not show increased egg laying compared to the wild type animal. Similar results were shown for other serotonin reuptake inhibitors. These animals also showed reduced thrashing behaviors in the absence of fluoxetine compared to wild type (having both GRK1 and GRK2) or *C. elegans* without GRK1. This may suggest that these animals respond differently to serotonin and this is maybe because of an excess in the serotonin metabolite 5-HIAA, which has been reported previously to be directly associated with the loss of GRK2 activity in these animals. Thus far, fluoxetine treatment from 5-15 minutes in M9 buffer did not increase thrashing behavior of any of the strains tested.

Conclusions

In this study, we studied the effect of fluoxetine on *C. elegans* with or without various GRKs. This study showed that animals without GRK2 reacted differently to fluoxetine in terms of egg laying, with fluoxetine not able to increase their egg laying, unlike that with wild type and animals without GRK1. Furthermore, although our present fluoxetine treatment conditions did not change thrashing behaviors, the animals without GRK2 showed reduced levels of thrashing compared to the other animals. This suggests that animals without GRK2 may react differently to serotonin, implying that potentially neurological disorders related to low GRK2 protein expression in the brain may respond differently to selective serotonin reuptake inhibitors like fluoxetine.

12: RNA sequencing reveals that CYP3A5 siRNA treatment induces cell cycle blockade and senescence in MDAPCa2b human prostate cancer cells

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Purpose

As we have previously reported that CYP3A5 inhibition block prostate cancer (PC) cell growth. Now, we want to understand the role of CYP3A5 as a promoter of PC growth in African Americans (AA) because AAs preferentially carry wild type CYP3A5 gene, often present with aggressive disease.

Methods

We used MDAPCa2b PC cell line of AA origin carrying one copy of wild type CYP3A5 for our study. After inhibiting CYP3A5 using siRNA pool of 3siRNAs, we performed Illumina RNA sequencing. Differentially expressed genes (DEGs) between non-target and CYP3A5 siRNA sample were identified using DESeq2. Furthermore, KEGG pathway analysis was performed to identify the roles of differentially expressed genes in regulating prostate cancer growth.

Results

We identified 1814 DEGs, 825 of which increased or decreased expression greater than two-fold. The differentially down-regulated genes associate with several growth regulatory pathway such as cell cycle progression, cellular senescence, DNA replication, and base excision repair. Additionally, we identified that CYP3A5 siRNA downregulates several genes which are dysregulated (including oncogenes and tumor suppressors) in different cancer type including RAS, c-Met, ERBB2, cyclin E, p53, Myc, PTEN, RAR-beta, and CDK2. The upregulated genes correspond to two pathways, retinol metabolism pathway (arrest proliferation) and steroid hormone biosynthesis. We have also identified several unique genes like Glo1, FoxM1 (often upregulated in several cancers) and Tk1 (marker of chemotherapy sensitivity) which are downregulated with CYP3A5 siRNA treatment.

Conclusions

CYP3A5 siRNA inhibits several genes involved in cell growth and proliferation. Targeting CYP3A5 represents a potential novel therapeutic approach, especially for AAs expressing wild type CYP3A5.

13: Investigating the Relationship between Fluoxetine and G protein Coupled Receptor Kinases Utilizing Caenorhabditis Elegans as an Experimental Model

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Purpose

Selective serotonin reuptake inhibitors (SSRIs) are commonly prescribed for depression. However, their effects on how G protein coupled receptor kinases (GRK), protein kinases that modify serotonin receptor activity, can change their effectiveness is unclear. This is important to determine since GRK expression levels can be modified in various neurological disorders. In this study, we examine the effects of fluoxetine on serotonin-mediated egg laying activities in *Caenorhabditis elegans*. We then examine the effects of serotonin after this initial treatment.

Methods

3 day old *C. elegans*, either N2 (wild type), GRK1 or GRK2 knockout *C. elegans*, were treated for 24 hours within their NGM plate with 1 microM or 10 microM fluoxetine. Then the eggs were moved to plates coated with 10 microM serotonin for an additional 24 hours. Egg laying after both 24 hours fluoxetine treatment followed by 24 hours serotonin treatment was then counted. Eggs laid was interpreted as eggs laid per worm.

Results

The different *C. elegans* strains had different responses, suggesting that GRK protein levels can play important roles in serotonin signaling modified by fluoxetine. The wild type N2 animals responded to high fluoxetine levels by increasing egg laying. They then showed reduced egg laying upon serotonin treatment. This is similar to that which was observed with animals lacking GRK1 except they showed more egg laying in response to fluoxetine. Animals lacking GRK2, however, did not respond to any dose of fluoxetine tested and also did not respond to serotonin after fluoxetine treatment.

Conclusions

In this study, we saw different reactions of *C. elegans* to fluoxetine, depending on if it lacks GRK1 or GRK2. In particular, these results showed that animals lacking GRK2 did not respond to fluoxetine at the concentrations tested nor did it respond to serotonin after fluoxetine treatment. This suggests that GRK2 knockout animals lack an ability to respond to fluoxetine. Combined with the reaction to fluoxetine of the GRK1 knockout animals, these results suggest that GRKs may play an important role in modifying responses to SSRIs in the human brain.

14: Predicting Substitutes for Doxorubicin within the FAC and TAC Chemotherapeutic Regimens By Looking at Gene Regulation Similarities and Differences

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Purpose

Doxorubicin is often incorporated into various regimens to treat triple negative breast cancers. However, this drug may lead to the long-term adverse effect of cardiotoxicity, which affects many women post-doxorubicin treatments. Therefore, it is important to determine if doxorubicin can be replaced successfully within various regimens to avoid cardiotoxicity but still get the maximum impact of the treatment. This study attempts to predict a doxorubicin replacement using common gene relationships and determine their efficacy to substitute for doxorubicin within the FAC regimen (5-fluorouracil-doxorubicin-cyclophosphamide).

Methods

We used the database ctdbase (ctdbase.org) and the triple negative breast cancer cell line MDA MB 231. Within ctdbase, we compared the genes related to doxorubicin and potential substitutes (paclitaxel, etoposide, vinorelbine, cisplatin, pemeltrexid, topotecan, gemcitabine, mitomycin and hydroxyurea). Herein, we looked at the percentage similarities and differences in terms of genes regulated between doxorubicin and these potential substitutes. We then tested the drug that is most similar or different compared to doxorubicin, in regards to the percentage of overlap of genes regulated, and tested them, combined with 5-fluorouracil and cyclophosphamide, for their ability to mimic doxorubicin-mediated MDA MB 231 cell death.

Results

From our bioinformatic analysis of genes related to doxorubicin functions compared to other potential chemotherapeutics, we identified some potentially good candidates and bad candidates to replace doxorubicin. From our gene relationships analysis, cisplatin showed the most similarity to doxorubicin and vinorelbine showed the least within the FAC regimen. Within the TAC regimen, this was also the case, with cisplatin covering for doxorubicin the most whereas vinorelbine showing the least coverage. In testing these replacements combined with 5-fluorouracil and cyclophosphamide (FCC or FVC), we found variable results depending on high and low concentrations of the regimen tested, with FVC and FCC causing lower cell death compared to FAC at the higher concentrations tested but FVC causing more cell death at the lower concentration compared to FAC and FCC.

Conclusions

In this study, we observed that, by looking at gene relationships within TAC and FAC, some drugs may give the most similar genetic regulation profile compared to doxorubicin within the regimens. These drug combinations can still lead to cell death within MDA MB 231 cells but showed some variability in effectiveness compared to doxorubicin when combined with 5-fluorouracil and cyclophosphamide. For example, as in the case of FAC, their ability to mimic the cell death mediated by doxorubicin may vary. However, no drug, at least preliminarily at the concentrations tested, show similar efficacy compared to the FAC regimen. This implies that replacing doxorubicin within the FAC regimen may not be as easy as just looking for drugs that are not cardiotoxic but have the closest genetic profile as doxorubicin. There may be other factors at play.

15: Developing a Method for Identifying and Quantifying Type-A Polymers in Cinnamon Extract Supplement Capsules (Research In-Progress)

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Author Affiliations

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Purpose

Cinnamon has a long history of use as a medicinal plant. A substantial body of in vitro and in vivo evidence suggests that cinnamon has multiple potential health benefits, including the ability to modulate glucose levels in people with type 2 diabetes mellitus. Type-a polymers are present in cinnamon and are believed to have an insulin-potentiating effect, which may be beneficial in those with type 2 diabetes mellitus. Currently there are no published analytical methods to identify and quantify type-a polymers in cinnamon. This is important to develop so cinnamon products can be evaluated for the presence and amount of beneficial components. This study will aim to create a method that can be used by industry to detect and quantify type-a polymers in cinnamon extract supplements.

Methods

Aqueous cinnamon extract will be used as the sample due to decreased amounts of the possibly toxic compounds found in raw cinnamon: cinnamaldehyde and coumarin. This study will attempt to develop and validate a reversed-phase HPLC analytical method. 10mg of the cinnamon extract powder will be measured and added to 1mL of 0.1 N acetic acid. The sample will then be centrifuged and 600ul of the solution will be injected onto a C18 column. An epicatechin standard will be used. A gradient elution will be used, beginning with a mobile phase consisting of 92% 0.1 N acetic acid and 8% acetonitrile for 90 minutes. At 130-160 minutes it will transition to 15% acetonitrile. At 180 minutes it will transition to 20% acetonitrile. At 200 minutes, there will be an 8-minute transition to 100% acetonitrile. UV detection will be at an absorbance of 278nm at a flow rate of 1mL/minute. Peaks will be identified, assessed for adequate separation, and quantified using the epicatechin standard.

Results

NA

Conclusions

NA

16: Identifying New G protein Coupled Receptor Kinase 2 Interacting Proteins By Looking at What is Known About Established Interactors- A Bioinformatic Approach

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Purpose

In addition to phosphorylating G protein coupled receptors (GPCRs), G protein coupled receptor kinase 2 (GRK2) can also phosphorylate some non-GPCRs, with these protein-protein interactions playing many roles in a variety of diseases. Identifying what other proteins GRK2 can additionally phosphorylate could be important since this protein kinase is often found to be upregulated or downregulated in a number of diseases, suggesting key functions for these proteins in certain disorders. In this study, we attempt to identify new GRK2 phosphorylation substrates by identifying common features of known GRK2 substrates and looking at amino acid sequence homology surrounding experimentally verified and bioinformatics- predicted GRK2 phosphorylation sites, coming up with consensus amino acid sequences that would be used to query for new proteins.

Methods

We used the phosphorylation site predictor GPS (2.1, 3.0, 5.0), a number of bioinformatic databases (Uniprot, Phosida) and BLAST-P from NIH. We utilized GPS to identify the best and worst GRK2 substrates. The best predicted GRK2 phosphorylation sites were aligned with known GRK2 phosphorylation sites and a consensus sequence was established. This was then used in BLAST-P searches to identify proteins that have similar phosphorylation sites amino acid sequences. Also, bioinformatic databases were queried to look for common post-translational modifications of the best GRK2 substrates. We also did this for the identified proteins from BLAST-P searches to help determine what potentially is a good GRK2 substrate to further study in cells.

Results

Using this approach, a number of potentially good GRK2 substrates were discovered, with some potentially having a high possibility of being a better GRK2 substrate based on their post-translational modifications. First of all, analyzing experimentally verified GRK substrates, some were deemed to be better GRK2 substrates than others by phosphorylation site predictors. Some of these contain certain post-translational modifications that could make them better substrates, although no consistent modification was observed. Doing BLAST-P searches on the consensus amino acid sequence surrounding the best GRK2 phosphorylation sites, some proteins were identified, with some unique post-translational modifications that may better make them GRK2 phosphorylation substrates.

Conclusions

In this study, we attempted to use bioinformatic approaches to identify GRK2 substrates. In particular, this showed that maybe we can identify new GRK2 substrates by observing what is known about previously established GRK-interacting proteins. For example, a number of proteins were identified that matched our consensus amino acid sequences entered, with some being better matches than others. This means that using this approach may help us identify potential GRK2-interacting proteins, which will help us determine the importance of GRK2 in various diseases.

Clinical Abstracts

17: Orthodontic treatment modalities, do the finished smiles differ?

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Purpose

This project will evaluate the level of accuracy of orthodontists at determining the treatment mechanism used to treat a case by examining only smile esthetic and frontal occlusion. There have been studies that have looked at esthetic indicators and how they impact both the orthodontist and the layperson's assessment of the case. However, this study is unique in that it will explore orthodontist bias against certain treatment mechanisms and how that bias may impact their accuracy in assessing treatment mechanisms given smile esthetic and frontal occlusal outcomes.

Methods

This research utilizes a cross-sectional study which will be assessed by use of a survey. The survey will consist of two main questions across multiple outcome photographs and ten additional demographic and treatment preference questions. The survey will be distributed online to 4400 orthodontists through the AAO. There will be a compilation of smile and frontal occlusion photos (one frontal occlusion and one smile for each case) with two accompanying questions for each. One question asks the orthodontists to rate the photos esthetically based on the smile and occlusion and the other asks them to identify the treatment mechanism provided. The photo combination will consist of 20 finished cases who have already been treated with different orthodontic treatment mechanisms including Invisalign, traditional braces, in-house-aligners, and teleorthodontic approaches. The cases will then be divided into 4 groups consisting of 5 subjects for each orthodontic treatment approach from a sample size of 20 subjects.

Results

This research project is still in progress.

Conclusions

Hypothesis: Evaluating the outcome of a case based solely on the smile and frontal occlusion, orthodontists will not be able to accurately determine the treatment mechanism used. But their biases with regards to which treatment they believe to be most effective and capable of creating the best outcome will become obvious based on how they evaluate the esthetic result and which treatment category they choose.

18: Comparison of liposomal bupivacaine versus bupivacaine with epinephrine versus the combination in postoperative pain management following spinal surgery

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Purpose

Liposomal bupivacaine is a long-acting, sustained-release formulation of bupivacaine HCl. Limited evidence suggests that liposomal bupivacaine may safely decrease postoperative opioid requirements, pain scores, and length of stay in patients undergoing spine surgery. The objective of this study is to compare the 72-hour postoperative opioid consumption after administration of liposomal bupivacaine versus bupivacaine with epinephrine versus both liposomal bupivacaine and bupivacaine with epinephrine.

Methods

The electronic medical record system will identify patients who were administered liposomal bupivacaine, bupivacaine with epinephrine, or both liposomal bupivacaine and bupivacaine with epinephrine from 2017 to 2021. Patients will include those 18 years or older who have undergone spinal surgery and were admitted to the hospital for equal to or greater than 24 hours. Patients will exclude those discharged on the same day as the spinal surgery date or who did not have documented administration times for bupivacaine therapy. The following data will be collected: patient age, gender, ethnicity, weight, height, type of surgery, date of surgery, date of hospital discharge, dose and time of liposomal bupivacaine and/or bupivacaine with epinephrine administered, pain medications administered pre-surgery, pain medications administered within 72 hours post-surgery, muscle relaxant medications administered within 72 hours post-surgery, documented post-operative numerical pain scores, and adverse events. For the primary outcome, opioid consumption will be evaluated at 24 hours, 24 to 48 hours, and 48 to 72 hours post-surgery using the Kruskal-Wallis test. Total opioid consumption within 72 hours post-surgery will be reported as morphine milligram equivalents. If available, prior to admission pain medications and opioids prescribed at discharge will be collected. Secondary outcomes are pain scales, length of stay, and non-opioid pain medication consumption.

Results

NA

Conclusions

NA

19: Literature Review of the Skeletal effects of Rapid Palatal Expanders in Mixed Dentition

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Purpose

Rapid palatal expansion (RPE) is utilized in Orthodontic treatment to correct maxillary transverse deficiencies in children and young adolescents, when the palatal sutures are still malleable. The amount of expansion varies on a case to case basis, and is a mixture of the combination of skeletal and dental expansion. This review will summarize the findings into the amount of maxillary skeletal expansion that has occurred from a variety of published studies.

Methods

A literature review of retrospective/clinical trials of the skeletal effects of maxillary RPE was performed using PubMed. A total of 15 articles were found. Inclusion criteria included: the appropriate age group (8-13 years of age) and appropriate sample size for significant values. Exclusion criteria included any studies including subjects with developmental defects, such as cleft palate.

Results

RPE significantly increases the maxillary skeletal transversal dimension in the short-term, as well as the dentoalveolar dimensions. Although some relapse does inevitably occur upon removal of the appliance, the amount of skeletal expansion does maintain a statistically significant amount of expansion with proper retention.

Conclusions

The effectiveness of the included studies reported that skeletal expansion was a useful approach to increase the transverse skeletal width for subjects that needed maxillary expansion.

20: Frequent ED users: Association between certain features and frequent ED users in regional health emergency department

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Purpose

Research has suggested that patients who have chronic illnesses and report having a lower socioeconomic status are more likely to frequent the emergency department (ED). These patients often have complex needs ranging from, medical and social, to behavioral health needs. Nevadans who fall under this demographic are visiting the ED as a source of continuing care and are utilizing healthcare services at higher rates. The financial burden of these services falls not only on local Nevadans, but also on the emergency department thereby creating an essential demand to assess and address the underlying reasons for high service utilization. We propose to investigate the association between certain features and the number of ED visits among these frequent visitors. We anticipate that understanding these associations will help in identifying improvements in care coordination.

Methods

Data from a subset of patients who visited a regional health system ED between the period of 01/01/2020 thru 08/24/2021 will be analyzed. Variables in the dataset will include medical record number (MRN), zip code, ED arrival date, insurance status, principal diagnosis code, principal diagnosis name, direct cost, total cost, and discharge disposition. This study will attempt to understand and address the relationship between ED visit frequency and other variables of interest. Descriptive and inferential statistics will be employed to analyze patient data, and all analyses will be performed using SPSS version 25 and Microsoft Excel

Results

N/A

Conclusions

N/A

21: Evaluation on appropriateness of fluoroquinolone use in an acute-care hospital

Cynthia Huang,¹ Stephen Chromi,¹ Sonny Surapaneni,¹ Jonathan Cho,¹ Pavlin Dimitrov.¹

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Purpose

The purpose of this study was to assess the appropriateness of fluoroquinolone (FQ) utilization at an acute care teaching hospital. Results of this study may help further define established hospital criteria for use and identify areas for improvement in provider education and competency.

Methods

This was a concurrent observational medication use evaluation conducted at a 425-bed acute care hospital in Las Vegas, Nevada from August 2nd, 2021 to October 31st, 2021. Inclusion criteria consisted of patients who were administered at least one dose of ciprofloxacin or levofloxacin while hospitalized. Exclusion criteria were pregnancy or breastfeeding, history of FQ-associated adverse reactions, and hypersensitivity to FQs. Patients were identified via a clinical surveillance software and chart reviews were performed utilizing the electronic medical record for data collection. FQ use was determined to be appropriate based on hospital criteria for use. Patients were monitored during the course of FQ use for adverse drug reactions and culture results.

Results

A total of 280 patients were prescribed FQs during the study period. Use of FQs was appropriate in 115 patients (41.1%). The study identified inappropriate use of FQs in 165 patients (58.9%). FQs were most commonly prescribed for urological surgery prophylaxis in 72 patients (25.7%) with only 37 of these patients having a true penicillin allergy. Interventions on FQs that did not meet criteria for use were made on 17 patients with a change in therapy or discontinuation of FQs occurring in 9 patients. Adverse reactions due to FQ use occurred in 19 patients (6.7%): 14 patients experienced hyperglycemia, 4 patients experienced QT prolongation, and 1 patient had possible *Clostridioides difficile* infection.

Conclusions

The findings of this study show that a majority of FQs utilization did not meet the hospital's criteria for use. Revising current hospital criteria for use and order sets for urological surgical procedures may improve FQ utilization. Pharmacist and provider education on alternative recommendations for antibiotics in place of FQs disseminated through in-service presentations and informational handouts can also improve appropriate FQ use upon order entry and verification.

22: Bimekizumab - A Promising Biologic Agent for the Treatment of Moderate-Severe Plaque Psoriasis.

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Purpose

The purpose of this clinical review is to examine the clinical efficacy and safety of bimekizumab compared to ustekinumab, adalimumab, and secukinumab for the treatment of moderate to severe plaque psoriasis.

Methods

Clinical trials for bimekizumab were identified and reviewed using PubMed. Phase 1 and phase 2 clinical trials were excluded. Peer-reviewed, published phase 3 clinical trials for bimekizumab were included for analysis.

Results

Bimekizumab is a recombinant monoclonal antibody that inhibits the cytokines IL-17A and IL-17F. Four Phase 3 clinical studies were reviewed and analyzed. These studies compared bimekizumab to placebo or other biologic agents that are FDA approved for treatment of moderate to severe plaque psoriasis. Bimekizumab was dosed at 320 mg subcutaneously every 4 weeks for 16 weeks, followed by a maintenance dosing frequency of every 4 or 8 weeks. The BE-READY study evaluated the efficacy and safety of bimekizumab compared to placebo. The BE-VIVID study compared the efficacy and safety of bimekizumab to ustekinumab, an IL-12/23 inhibitor. The BE-SURE study compared the efficacy and safety of bimekizumab to adalimumab, a TNF-alpha inhibitor. The BE-RADIANT study compared the efficacy and safety of bimekizumab to secukinumab, an IL-17A inhibitor. Bimekizumab demonstrated consistent improvement in skin clearance in all four clinical trials, showing up to a 75% decrease in plaque surface area after a single dose, and as much as 90% to 100% improvement by week 16. These improvements were measured by determining the proportion of subjects that achieved PASI90, PASI100, and Investigator's Global Assessment (IGA) scores of 1 and/or 0. Bimekizumab also demonstrated a safety profile similar to comparators.

Conclusions

In clinical trials, bimekizumab demonstrated non-inferiority and superiority in clinical efficacy relative to placebo and comparator biologics when assessing reduction in plaque surface area on patients with moderate to severe plaque psoriasis. Additionally, bimekizumab demonstrated a safety profile similar to comparator biologics. Further studies will be necessary to establish the place of therapy and additional clinical benefits in the therapeutic management of an often overlooked autoimmune disease.

23: Evaluation of Appropriate Use of Fluconazole and Micafungin at a Teaching Hospital

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Author Affiliations

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Purpose

The purpose of this medication use evaluation (MUE) is to assess the appropriate utilization of fluconazole and micafungin in the context of this institution's restricted criteria.

Methods

This was an observational, concurrent MUE conducted at a 425-bed tertiary care hospital in Las Vegas, Nevada. A list was compiled using our clinical support software of all adult hospitalized patients with an order for fluconazole or micafungin between August 9th and October 31st, 2021. Patients were excluded if they only had a one-time dose of antifungal or were prescribed antifungals for organ preservation. Data collected from each patient's chart included demographics (age, sex), medication use (dose, frequency, duration, route of administration, and indication), if patient met restricted antimicrobial criteria, and if there were any interventions by pharmacy. Restricted criteria for appropriate use included indication for therapy (empiric or definitive), clinical status, and if patients had risk factors for invasive fungal infection. Criteria for appropriateness were adopted from the 2016 Infectious Diseases Society of America clinical practice guidelines for the management of candidiasis.

Results

During the study period 168 patients met inclusion criteria. One hundred and sixteen of these patients were prescribed fluconazole and 52 were prescribed micafungin. Ninety percent of patients prescribed fluconazole were appropriate and 83 percent of patients prescribed micafungin were appropriate. Out of the patients with inappropriate fluconazole, 42 percent had a pharmacy intervention and out of the patients with inappropriate micafungin, 67 percent had a pharmacy intervention. Common reasons for the inappropriate use of both agents included initiation without documented clinical indication or empiric initiation without risk factors for invasive candidiasis. In the 168 patients examined, there were a total of 62 documented pharmacy interventions. The most common interventions included intravenous to oral route conversion, discontinuation of therapy, and transition from micafungin to fluconazole when indicated.

Conclusions

In this MUE, the majority of patients were prescribed fluconazole appropriately, however, pharmacy intervention was required in the management of these patients to ensure guideline-based therapy. There were more inappropriate orders for micafungin, however, utilization of a restricted criteria policy with daily review by an infectious diseases pharmacist helped to streamline appropriate antifungal therapy.

24: Referral Patterns of Neonatal Healthcare Professionals for Cleft Lip and Palate Patients

Alyssa Morrow,¹ Ahmad Roosta.¹

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Purpose

Cleft Lip and Palate patients are some of the most vulnerable and complex orthodontic patients. These patients often require early complex orthodontic care in conjunction with surgical interventions. There is a consensus that the best treatment for CLP patients is provided through multidisciplinary teams of healthcare providers. Currently, there is very limited access to proper multidisciplinary care for CLP patients in the US, and in part that is due to lack of education about existing resources. For the most effective treatment and the best outcomes, it is essential that coordinated care starts at birth and parent education should begin as soon as CLP is detected in utero. This research will aid in improving care for CLP patients by raising awareness amongst medical professionals about the craniofacial orthodontic care of CLP, the proper sequencing, and local resources available. If the study finds that the educational program improves referral patterns in Las Vegas and Reno, Nevada, the hope is to continue delivering this education nationwide in conjunction with care teams in each state.

Methods

This study will explore referral patterns of healthcare professionals who may encounter Cleft Lip and Palate (CLP) patients at early stages using a set of surveys that measure both qualitative and quantitative benchmarks. After the initial pre-survey, there will be educational content presented on management of CLP patients from an orthodontic perspective. Following the educational program, a post-survey will measure the difference in referral patterns and overall awareness of attendees with respect to CLP patients. The survey aims to gauge the experience, knowledge, and management protocol of participants with regards to cleft lip and palate management. The survey also explores correlating factors - educational and demographic - that may contribute to referral patterns amongst participants. The correlation based on demographic and educational background will be tested using Chi square test. In addition, quantitative continuous data will be tested through use of t-test or ANOVA analog with post-hoc testing.

Results

Research has not yet begun.

Conclusions

The hypothesis is that increasing knowledge about the orthodontic care provided to CLP patients as a part of an interdisciplinary team will improve referral patterns amongst healthcare professionals. Final conclusions will be drawn once results are recorded and analyzed.

25: Accuracy of orthodontic diagnosis via tele-orthodontic consultation versus in-office consultation Delaram Mostafavi¹ Andrew LaPray,¹ Kimberly Jones-Rudolph.¹

Author Affiliations

¹Roseman University, AEODO/Orthodontics

Purpose

The objective of this study is to evaluate the accuracy of tele-orthodontics for orthodontic diagnoses versus in person clinical diagnoses. Since Covid-19, tele-orthodontics has become more widely used by orthodontists and favorable to patients as a way of minimizing direct contact and maximizing efficiency. As technology is advancing and virtual appointments are becoming more desirable for doctors and patients, tele-orthodontics has the potential of becoming a valuable adjunct to orthodontic treatment. If orthodontic diagnosis can be achieved at a clinically acceptable level by tele-orthodontics, this opens the possibility of greater access to care for some patients and potentially a more efficient way to practice orthodontics. The aim of the study is to determine which diagnostic criteria are adequately diagnosed by tele-orthodontics and which are not. The hypothesis is that certain diagnostic criteria are not accurately identified during a tele-orthodontic consultation as opposed to an in-office consultation with radiographs.

Methods

This comparative study is evaluating the accuracy of tele-orthodontics based on initial tele-orthodontic screening versus in-person clinical exam for at least 50 patients, by assessing the differences in measurement of certain identified parameters. For descriptive parameters the percentage of agreement will be considered, and Chi-Square test will be performed to determine if there is a statistically significant difference. For quantitative measures analysis will be done in terms of mean and standard deviation. T- test will be used to determine if there is a significant different between the means.

Results

This project is in development and results are pending.

Conclusions

If tele-orthodontics is found to be accurate for orthodontic diagnosis, even partially, it could be a beneficial tool to gather basic information and form a diagnosis before meeting the patient in the office. Consultations for the need of orthodontics could be done virtually to save the orthodontist and the patient time. This current study could reveal information that can impact the practice of orthodontics in the long-term by informing orthodontists as to the diagnostic accuracy of tele-orthodontics.

26: Occurrence of White Spot Lesions Post Orthodontic Treatment

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Purpose

White spot lesions pose a significant challenge in achieving esthetic excellence in orthodontic treatment. The primary objective of this study was to investigate the occurrence of white spot lesions (WSLs) on the upper anterior teeth after orthodontic treatment. The secondary objective of this study was to measure the proportion of tooth affected by WSL using an image mapping software and by modified Gorelick's WSL-index.

Methods

A total of 145 patients who had recently completed comprehensive fixed orthodontic treatment from an orthodontic clinic in Western United States were enrolled from records. Patients' demographic information and treatment duration was obtained. Pre-treatment digital photographs were used to collect information on pre-existing fluorosis on upper four front teeth. Post-treatment digital photographs were evaluated for the presence of WSL. Severity of WSL was assessed by modified Gorelick's WSL-index, and proportion of tooth area affected by WSL was measured by ImageJ software developed by National Institute of Health USA. Incidence rate of WSL development and their location on teeth were calculated according to age gender, and pre-existing fluorosis. Severity of WSL development was also studied for different categories of pre-existing fluorosis, and proportion of tooth-height above and below brackets.

Results

Preliminary analysis shows that 19 out of 145 (13.1%) patients developed WSL during their orthodontic treatment. There was no gender predilection noticed for development of WSL. One out of 27 patients (3.70%) with presence of pre-treatment fluorosis showed WSL, in comparison with 18/115 (15.25%) without pre-existing fluorosis, but the difference was statistically not significant ($p=0.91$). Among the 19 patients that developed WSL, about 84% (64/76) showed presence of WSL, suggesting that all front upper teeth are prone to development of WSL. Upper lateral incisors had higher occurrence of WSL compared to the central incisors. Only 1 tooth (out of 76) had severe lesion as per modified Gorelick's index, whereas about 34% (26/76) had moderate lesions. Upper right teeth exhibited higher percentage of moderate WSL's compared to the left side, and all right lateral incisors showed WSL. Percentage area of WSL relative to the entire tooth area varied between 1.16% to 32.6% among involved teeth, but association with tooth type was statistically not significant ($p=0.313$).

Conclusions

White spot lesions are the most undesired consequence of orthodontic treatment. Understanding their severity and prevalence helps in evaluating or revising treatment or modifying prevention protocols. This study showed an incidence rate of 13.1% as compared to average of about 45% in earlier literature. The maximum reported incidence of WSL has been 97%. In our study, most of the front upper teeth were observed to be affected among the patients developing WSL. Maintenance of good oral hygiene is the most important tool in prevention of WSL and is emphasized during treatment. Laxness in oral hygiene or difficulty in reaching spaces obstructed by wires may be important reasons in development of WSLs.

27: Testing the Activity of the Fast-Acting Antidepressant MI-4 and Analogs Against Monoamine Transporters

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Purpose

Depression is a debilitating disease, and the risk of suicide increases 20-fold for those diagnosed with depression compared to those without. Fast-acting anti-depressants that produce results more rapidly and maintain those effects longer compared to traditional anti-depressants are desirable. In this study, we screened compounds developed off the structure of MI-4, a fast acting antidepressant, against monoamine transporters.

Methods

Stable serotonin transporter (SERT), dopamine transporter (DAT) and norepinephrine transporter (NET) HEK 293T cell lines were developed and used to assess the inhibition properties of various analogs developed off the structure of MI-4 (Ro-25-6981) to alter neurotransmitter uptake activity.

Neurotransmitter uptake was assessed using the Neurotransmitter Transporter Uptake Assay Kit from Molecular Devices according to manufacturer's specifications. Maximum signals were identified from a plate reader and expressed as percent inhibition compared to vehicle control (Hanks' Balanced Salt Solution (HBSS) alone).

Results

Modifications to the structure of MI-4 lead to changes that alter neurotransmitter uptake activity towards specific neurotransmitter transporters. For example, TR-2 showed an increase in the ability to inhibit SERT transporter activity versus MI-4 whereas TR-12 showed a decrease in ability to inhibit the same transporter in relation to MI-4.

Conclusions

In this study, we sought to test compounds derived from the fast-acting antidepressant MI-4 for their ability to inhibit monoamine transporters. By modifying the structure of MI-4, we were able to modulate the inhibition of the neurotransmitter transporter. The varied inhibition of the transporters will allow for further studies into the mechanism of fast-acting antidepressants such as MI-4. The NMDA inhibitory activity for some of the compounds is known, but further studies will allow for the comparison of all compounds against NMDA.

28: Maxillary Growth in Cleft Lip and Palate Children Treated With Alveolar Bone/Cleft Grafting: A Scoping Review

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Purpose

In cleft lip and palate (CL/P) patients, many of the surgical and orthodontic procedures used in the management of these individuals, such as alveolar bone grafting, can affect the growth of the maxillofacial complex. The present study performs a scoping review of the research regarding (secondary) alveolar bone grafting in cleft lip and palate patients to determine the extent to which this procedure affects skeletal growth of the midface, notably the maxilla. In addition, this study identifies and summarizes the relationship between the timing (dental and chronologic age), various methodologies, and patient and cleft characteristics associated with alveolar bone grafting to maxillofacial growth.

Methods

Online databases were searched to identify relevant papers, from which XX publications were selected after title and abstract and full text review that assessed the effect of alveolar bone grafting, completed between the ages of 4 and 16, on the growth of the maxilla in cleft lip and palate patients.

Results

NA

Conclusions

NA

29: Literature Review of Palatal Expansion in Primary Dentition

Deshek Patel;¹ Man Hung;¹ Joseph Cheever;¹ Jessica Bishop.¹

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Purpose

The purpose of this narrative review is to identify and evaluate orthodontic treatments used to expand the maxillary dentition and/or correct posterior crossbites, especially in the primary dentition. Palatal Expansion in the primary dentition can involve various fixed and removable appliances that sit on a patient's palate for a few weeks to months to expand the palate via skeletal/dental expansion. The efficacy of rapid maxillary expansion in children will also be evaluated and we shall see if there is a real orthodontic effect, even at an early age. Relapse potential for palatal expansion will be discussed, as if overcompensation is done correctly, then relapse potential minimizes.

Methods

A literature review of Palatal Expansion in primary dentition was performed using PubMed. Key words included "Palatal Expansion" and "Primary Dentition". A total of 12 articles were found. Inclusion criteria included: the appropriate dentition group (primary) and palatal expansion. Exclusion criteria included any studies including words with mixed, permanent dentition or dentoalveolar expansion.

Results

Results showed that removal of premature contacts of the baby teeth is effective in preventing a posterior crossbite from being perpetuated to the mixed and adult dentitions. In addition, in cases with 5 to 9 mm of crowding, some can be approached with expansion after thorough diagnosis and treatment planning. Overall, the magnitude of arch perimeter change found in a study, a mean of 4 mm, could improve the potential for the normal eruption of permanent teeth in these patients with constricted maxilla.

Conclusions

Even if palatal expansion can be achieved in primary dentition, it is recommended that treatment be started as soon as the diagnosis is made and cooperation allows for it. Young patients show greater and faster results in less time. Esthetics are greatly enhanced, compliance is improved, and the possible psycho-social scars can be greatly reduced.

30: Did the pandemic change future treatment choices amongst orthodontists?

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Purpose

The overall objective of this research is to determine if tele-orthodontics and an increased use of clear aligners are considered beneficial and positive additions to the practice of orthodontics and what barriers may exist to implementation of tele-orthodontics and clear aligner therapy in greater numbers of orthodontic practices in the long-term.

Methods

A literature review using the keywords: covid, aligners, tele-dentistry and tele-orthodontics was used to attain background information on the effects of the covid-19 pandemic on orthodontic treatment options. Based on the literature review, this research will consist of an exploratory study, assessed through a 19-question survey. The survey questions were designed to: 1) establish demographics, 2) determine whether tele-orthodontics and clear aligners are used by the orthodontists in their practices 3) Assess whether the usage of clear aligners and tele-orthodontics has changed due to the Covid-19 pandemic. 4) Ascertain if orthodontists intend to continue providing these treatment modalities in their practice and if not, why.

Results

N/A

Conclusions

N/A

31: Gingival enlargement in orthodontic patients

Micah Tabanfar;¹ Ben Raymond.²

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Purpose

The purpose of this review is to explore the prevalence of, the causes of, and the treatments of gingival enlargement in orthodontic patients. Orthodontic treatment involves various fixed and removable appliances that sit on oral surfaces for months or years in a row. These appliances contribute to gingival enlargement mostly due to an increased accumulation of plaque near gingival margins but also can deposit metals into the gingiva. In some cases, excess gingival tissue can negatively affect orthodontic treatment as the gingiva encroaches onto brackets/attachments.

Methods

A thorough PubMed search was conducted to find and analyze relevant studies in regard to gingival hyperplasia and/or enlargement in orthodontic patients.

Results

Gingival hyperplasia in orthodontic patients is not rare and has the potential to negatively impact not only the periodontium but also orthodontic treatment. Treatment of gingival enlargement in orthodontic patients can involve improved oral hygiene, various mouth rinses, and excision of excess gingival tissue.

Conclusions

The prevalence of orthodontic hyperplasia in orthodontic patients cannot be denied. Dentists, including generalists and specialists, must monitor gingival hyperplasia in orthodontic patients and treat these patients in an individualized basis.

32: Effect of Diabetes Mellitus on Osteoclast Count in Orthodontic Tooth Movement in Rat Models

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Purpose

Bone resorption is caused by osteoclast activity in the compression side and by the osteoblast induced formation of new bone in the tension side. With excessive bone resorption, orthodontic tooth movement may happen through remodeling of alveolar bone in response to mechanical loading. Additionally, an alteration of the metabolic state, which occurs in patients with diabetes mellitus, can interfere with bone remodeling and result in a different rate of orthodontic tooth movement. The aim of this study was to evaluate the effects of diabetes on osteoclast recruitment and activity and, consequently, on orthodontic tooth movement in mouse models.

Methods

A scoping review of literature was conducted to address the aim of this study. Database search was carried out in GoogleScholar, PubMed, Science Direct, Medline and Ebsco Host. The keywords for article search consisted of orthodontic tooth movement, diabetes mellitus, and osteoclasts. Only experimental animal studies were included for the analysis.

Results

This study is currently in-progress. We hope that the results of the study can enhance our understanding of whether osteoclastic recruitment and function are altered in patients with diabetes mellitus.

Conclusions

Having adequate knowledge about the effect of diabetes on osteoclast activity and orthodontic tooth movement will allow orthodontic practitioners to better predict and manage orthodontic tooth movement when treating patients with diabetes mellitus.

33: Outcomes of Vancomycin Minimum Inhibitory Concentrations in Methicillin-Resistant Coagulase-Negative Staphylococcal Bacteremia

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Author Affiliations

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Purpose

Worse outcomes have been observed in methicillin-resistant *Staphylococcus aureus* (MRSA) with vancomycin minimum inhibitory concentration (MIC) of two or higher. There is a lack of evidence whether this relationship exists with methicillin-resistant coagulase-negative staphylococci (CoNS). The few studies that have been published have shown mixed results. The lack of evidence, coupled with rising antimicrobial resistance, MIC creep, and increasing prevalence of CoNS as important nosocomial pathogens, make it imperative to investigate this clinical question. Therefore, the objective of this study is to examine vancomycin effectiveness and patient outcomes in methicillin-resistant CoNS bacteremia.

Methods

This is a retrospective study involving electronic medical record review within our hospital system. Patients will be separated into two groups according to vancomycin MIC breakpoints, specifically, MIC less than or equal to one and greater than one. Patients will be included if they were 18 years or older; had two blood cultures positive for methicillin-resistant CoNS susceptible to vancomycin; had repeat blood cultures within 48 hours of the positive index culture; and received at least 48 hours of vancomycin therapy. Patients will be excluded if they had infective endocarditis or infected cardiac devices; had concomitant acute infections due to other organisms; had polymicrobial bacteremia; or survived less than 24 hours after index cultures were obtained. The primary outcome is time to first negative blood culture from index culture collection date. Key secondary outcomes include recurrent bacteremia within 30 days of the end of definitive therapy, 30-day all-cause mortality, and change in therapy due to clinical deterioration, as well as safety outcomes. The following patient data will be collected: demographics, comorbidities, microbiologic culture data including MIC, antibiotic therapy, and vancomycin dosing with corresponding levels. Descriptive statistics will be used for patient baseline characteristics. Comparisons between groups will be conducted using appropriate inferential statistical analyses.

Results

NA

Conclusions

NA

34: Evaluation of Visual Treatment Objective (VTO) Accuracy in Nonsurgical Orthodontic Treatment

Michael Trieu¹ Glen Roberson;¹ Pramod Sinha;¹ Calvin Heinrich.¹

Author Affiliations

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Purpose

Visual treatment objectives (VTOs) predict the effects that different hard tissue movements can have on a person's facial soft tissue. This is a powerful tool that can provide doctors with a visual prediction of what a patient would look like through various surgical and orthodontic movements while also providing a means to effectively communicate with patients. Initially, VTOs were drawn by hand, but technological innovations have provided the ability to perform VTOs digitally, building upon procedures and predictions that initial VTO founders employed. While numerous studies have been conducted evaluating the accuracy and validity of both manual and digital VTOs, most of these studies are implemented in the context of surgical orthodontic treatment. In consideration, this study will investigate VTOs strictly in a non-surgical context and evaluate the accuracy at various anatomic landmarks.

Methods

Computerized tomographic scans of the head will be conducted by i-CAT FLX17-19 as part of routine records for orthodontic treatment and uploaded to Dolphin. Pre-treatment scans will be rendered to obtain diagnostic information including the lateral cephalogram, which will then be digitized and superimposed onto the patient's side profile photograph for the VTO. A Post-treatment cephalogram will be used to record the orthodontic movements that were performed and a post-treatment profile photo will be used to evaluate the resulting soft tissue profile. Applying these movements to a pretreatment VTO, we can compare the rendered VTO to the actual post treatment images and evaluate the soft tissue VTO accuracy at different anatomical landmarks. Setting type I error at 0.05 and type II error at 0.20 and taking into account a previous study containing a difference of 0.25, the sample size was determined to be 24.

Results

No results have been captured at this time as data collection process is currently ongoing.

Conclusions

No results have been captured at this time as data collection process is currently ongoing.

35: Survey of Orthodontists that Screen for Obstructive Sleep Apnea in the United States

Andrew Triggs;¹ Karthikeyan Subramani;¹ Glen Roberson;¹ Kisshore Chaudhry.¹

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Purpose

The purpose of this study is to investigate trends across the United States of orthodontist's preferred screening methods for Obstructive Sleep Apnea (OSA). The objectives are to determine the frequency in which orthodontists are screening their patients for OSA, which screening modalities are most commonly used, the confidence level orthodontists have in screening for OSA, and to determine if there is any correlation between the screening methods used and an orthodontist's length of time in practice, age, practice setting, practice location, residency location, or number of continuing education hours completed on the subject of OSA post-residency.

Methods

The questionnaire was created, reviewed, and approved by the Research Advisory Committee at Roseman University of Health Science's Advanced Education in Orthodontics and Dentofacial Orthopedics (AEODO) program and subsequently sent to the American Association of Orthodontists' (AAO) Partners in Research Program for approval. The questionnaire was administered via Qualtrics and disseminated by the AAO's Partners in Research Program to a random sample of 5,880 orthodontists from their database of 9,558 active orthodontic members in the United States. A sample size of 358 orthodontists was determined to be sufficient for this project. Data will be analyzed using SPSS statistical software; frequency and proportion of similar responses will be calculated for each item on the questionnaire and logistic regression will be used to determine if the different demographic factors were associated with screening for OSA. Significant differences will be identified by Chi-square tests and logistic regression.

Results

A total of 235 responses were collected and the data analysis process is currently ongoing.

Conclusions

No conclusions have been made at this time because the data & statistical analysis process is currently ongoing.

36: Evaluation of Appropriate Initiation and De-escalation of Piperacillin-Tazobactam in Hospitalized Patients at an Acute Care Hospital

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Author Affiliations

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Purpose

The purpose of this medication use evaluation is to assess appropriate use of piperacillin-tazobactam based on patient-specific risk factors, actions taken to de-escalate when warranted, and identify areas for improvement.

Methods

Patients who received at least two doses of piperacillin-tazobactam were included in this evaluation. On day one, demographic data, risk factors, and empiric indication were collected. Demographic data include age, gender, and creatinine clearance. Risk factor data included previous hospitalization within 90 days, previous IV antibiotic use within 90 days, history of Pseudomonas within six months, and presence of immunosuppressive state. On day three, definitive indication, relevant positive cultures, and appropriateness of action taken were documented.

Results

Eighty-eight patients were included. The mean age of patients was 62 years, where 37 (42.0%) were female. 27.3% of patients were admitted to the ICU. The most prevalent risk factor for Pseudomonas coverage was recent hospitalization for at least two days within 90 days (60.2%). 54.5% received IV antibiotics within 90 days, 4.5% were immunocompromised, and 2.3% had history of Pseudomonas within six months. The most common indication for initiating piperacillin-tazobactam was sepsis (21.6%), followed by skin and soft tissue infections (18.2%), intra-abdominal infections (17.0%), hospital/ventilator-acquired pneumonias (11.4%), empiric (6.8%), and complicated urinary tract infections (5.7%). On day one, 80.7% of the orders for piperacillin-tazobactam were appropriate based on patient-specific risk factors and clinical judgement. On day three, 42% of orders were de-escalated or discontinued, 56% of orders were continued, and 2.3% of orders were escalated. 80.7% of actions taken were deemed appropriate. Within the patients examined for this evaluation, 37.5% (n=33) had positive cultures where 9.1% (n=8) lead to de-escalation or discontinuation and 2.3% (n=2) lead to escalation of therapy.

Conclusions

The majority of piperacillin-tazobactam orders were initiated appropriately and interventions were made on day three of therapy; however, more surveillance and a structured de-escalation protocol would further aid in this process. Antimicrobial stewardship and the importance of the pharmacists' role in its implementation continues to be an integral part of patient care and antimicrobial resistance containment measure. Areas of focus for improvement include proper usage and continual monitoring for intervention opportunities.

37: Effects of Perceived vs Actual Frequency of Rewards on Orthodontic Patient Attitudes and Compliance

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Author Affiliations

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Purpose

Patient compliance affects the success of orthodontic treatment. Rewards given on an intermittent or partial schedule have been described in psychology as having a “partial reinforcement effect”; behaviors last longer if reinforced intermittently. This study will investigate the effectiveness of different rewards schedules on patient compliance (as represented by oral hygiene assessments), and attitudes towards orthodontic treatment. It will also determine whether actual or perceived reward frequency has a greater effect on compliance and attitudes.

Methods

This retrospective and cross-sectional study will use charts to identify eligible patients and obtain information on oral hygiene and actual frequency of rewards. Approximately 195 patients, previously seen in the orthodontic clinic for at least three recall patient visits between July 2020 and April 2021, will be surveyed at a subsequent recall appointment to obtain information on perceived frequency of rewards, attitudes toward the rewards program, and likelihood of making referrals to the orthodontic clinic; oral hygiene will also be assessed.

Results

NA

Conclusions

NA

38: CBCTs' Significance for Orthodontic Treatment Planning

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Purpose

The objective of this study is to help illuminate the utility of CBCTs in orthodontic practice through evaluating if findings from CBCTs alter orthodontic diagnoses and treatment plans. The question we will attempt to answer is, do orthodontic diagnoses and treatment plans change after the consideration of CBCTs?

Methods

This study will comparatively analyze orthodontic treatment plans made using traditional methods (panoramic X-rays, lateral cephalometric radiographs, model casts, and intra-oral and extraoral photographs) both with and without CBCTs. We will compare treatment plans for 62 patients made before and after consideration of CBCT to determine whether the findings resulted in a change in diagnosis or treatment plan. The data will be analyzed to find the proportion of cases that resulted in change in diagnosis and treatment planning after using CBCT. The proportion of change will also be compared according to various demographic characteristics (age and gender of patients) and assessment of clinical parameters on conventional examination (without CBCT), either as dichotomous or multiple categories based on severity. The difference in distribution according to clinical and demographic characteristics will be tested for statistical significance using chi square test.

Results

There is no results yet as we are still waiting for the Grand from the AAO to start our research project.

Conclusions

We hypothesize that 20% of orthodontic diagnoses and treatment plans will change after the findings from CBCTs. If we found that significant number of treatment plans and diagnosis have changed after evaluating CBCT's findings, then we would recommend having CBCT for more patients and possibly recommending CBCT as the standard of care.

39: Anterior Reposition Appliance with Definitive Orthodontics Utilizing Class III Mechanics: A Case Report

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Purpose

This case report aims to give the reader information on the ARA and its use with definitive TMJ treatment via orthodontics. The successful treatment with two (ARA and class III elastics) seemingly contradicting components is demonstrated.

Methods

31 year old female presents with complaints of TMD symptoms and awareness of a changing bite. She currently has headaches and facial muscle pain. Her dental history includes TMD treatment from trauma at a young age. She presents with class I occlusion and mild to moderate crowding. The overbite and overjet are normal. A Bolton discrepancy indicates excess tooth size on the mandibular arch. The radiology exam shows posterior positioned condyles, loss of joint space, and non-active degenerate joint disease. An ARA (anterior reposition appliance) was used to successfully reposition the condyles in the fossa. The resulting class III occlusion was corrected utilizing segmental removal of the appliance in conjunction with class III elastics with a vertical vector.

Results

The patient became symptom free two months post appliance wear. The condition was maintained throughout and after treatment. Class I occlusion was established with a normal overjet and overbite. The condyles maintained a proper position within the fossa.

Conclusions

The clinician is capable of using class III mechanics in conjunction with an ARA while maintaining the proper condyle to fossa relationship.

40: Invisalign in combination with miniscrew-assisted rapid palatal expander for treating maxillary transverse deficiency in an adult patient: a case study

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Purpose

Abstract: Traditionally, adult patients with maxillary transverse deficiency were subject to an invasive procedure, such as the surgically-assisted rapid palatal expansion (SARPE) or other surgical modalities. More recently, researches have demonstrated the effectiveness of the bone-bourne expander to correct the transverse deficiency of the maxilla in adult non-growing patients. In this case study, we report the use of a Microimplant-Assisted Rapid Palatal Expansion (MARPE) in conjunction with Invisalign for treating a 37 years-old female patient. MARPE has been a non-surgical alternative to treat the patient's transverse maxillary deficiency. Likewise, the use of clear aligners with MARPE has shown additional efficiency, as the expander can remain in place as a skeletal retainer during the clear aligner treatment.

Methods

N/A

Results

N/A

Conclusions

N/A

41: The Effects of Music Therapy on Agitation and Anxiety in Patients with Dementia

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Purpose

The primary aim of this quality improvement project is to examine the effectiveness of music therapy (MT) as a non-pharmacologic intervention in reducing symptoms of agitation and anxiety, in persons with mild to moderate dementia. By achieving significant, positive outcomes in this project, there will be more evidence to strengthen MT as an effective non-pharmacologic intervention for persons with Dementia. With this strengthened evidence, memory care centers are more likely to implement MT as part of their enrichment activities, preventing behavioral and psychological symptoms of Dementia and promoting a higher quality of life.

Methods

This quality improvement project will be a prospective comparative, pre-test/post-test design. Participants will include adults aged 65 years or older, diagnosed with mild to moderate dementia at one of three participating Las Vegas memory Care units, over an enrollment period of six weeks. MT sessions will be conducted for approximately 30 minutes, 2-3 times a week over eight weeks, following enrollment. The Neuropsychiatric Inventory will be utilized to measure behavioral and psychiatric symptoms. Screenings will be conducted 1 week prior to the start of MT and at the end of weeks four and eight. Overall, this project will range from a minimum of eight weeks to a maximum of 16 weeks.

Results

N/A (Research Proposal)

Conclusions

As the population of persons with dementia continues to rise, there is a growing need for further research into dementia care. The limitations of current literature are primarily due to sample size and duration of interventions. Ultimately, it is important to find interventions that are effective in managing behavioral symptoms of patients with dementia, not only for a patient's safety or to decrease caregiver burnout, but to compassionately promote a better quality of life.

Public Health Abstracts

42: Vulnerability During a Pandemic

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Purpose

The terms “Vulnerability” and “Marginalization” have many different definitions in the literature, but in population health, public health, and healthcare, they are the key concepts in the development of health disparities and health inequity. Despite initiatives in the U.S. to reduce or eliminate health disparities, poor outcomes including risk factors, such as access to healthcare and health care experience, the morbidity, and mortality, thrive in vulnerable populations. Vulnerability may present itself when one becomes dependent on others for care, cooperation, or assistance. Vulnerability is universal and constant and will always be part of the human condition and existence.

Methods

The CDC’s Social Vulnerability Index (SVI) is one of the most commonly used tool to measure the likelihood of populations, communities, or individuals at risk for negative health outcomes. The higher the score, the higher the vulnerability. The Social Determinants of Health (SDOH) are conditions in the places where people live, learn, work, and play that affects a wide range of health risks and outcomes. The parallels and complementarity of SVI and SDOH were explored.

Results

Vulnerability is transmitted across lifetimes and generations starting from childhood health, adult health, and family health and well-being. The role of nurses in addressing the health inequities has never been emphasized as much as we have now with the COVID-19 global pandemic. The pandemic revealed Americans’ unequal access to opportunities to live a healthy life. Current conditions magnified the systemic barriers such as poverty, racism, and discrimination, the identified source of health inequities.

Conclusions

Discussion of the essence of what makes a population vulnerable lies in the deprivation for others to live a healthy and fulfilling life. Experts in vulnerability created many tools to measure vulnerability in a social context such as CDC’s SVI. Understanding this concept that vulnerability is always a part of human existence will help nurses and other healthcare providers to continue creating and exploring opportunities to address and alleviate vulnerability.

43: Oral, cardiovascular and respiratory effects of e-cigarettes: Synthesis of Literature

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Purpose

The introduction of e-cigarettes into the tobacco market appeared to be a revolutionary product with a net public health benefit. Advertised to adults as an effective smoking cessation aid, e-cigarette sales soared in the U.S. However, there was a lack of available research on the actual benefits from switching to e-cigarettes from conventional cigarettes, and even more importantly on their possible long-term impacts.

Methods

A literature review was completed using Pubmed to examine all available articles in the area. The keywords utilized for the article search included “e-cigarretes”, “vaping”, “EVALI”, and “electronic cigarettes”. A total of n=98 research articles were found and reviewed, 57 of which involved experiments conducted on rats and 2 on mice. Most of the studies were conducted in the United States, however some studies were completed outside of the United States. This review focused on behavioral patterns in regard to age, and possible side effects involving the cardiovascular and respiratory systems as well as the oral cavity.

Results

The median age of EVALI survivors was 23 years and the median age of EVALI deaths was 45 years with most cases involving THC-containing products. E-cigarettes contain over 80 compounds, including known toxins. E-cigarette products emit these potentially toxic substances in highly variable amounts, with the number of substances and levels emitted varying drastically depending on the product and how it is operated. Due to the relative novelty of e-cigarettes, there is a lack of data on the association of vaping with long-term health effects. However, there was substantial evidence demonstrating the short-term effects of vaping which included: increased heart rate, acute endothelial dysfunction, and oxidative stress. Previously non-smoking young adults and adolescence are more likely to try conventional cigarettes once they use e-cigarettes.

Conclusions

Many of the adverse effects of e-cigarettes including respiratory, oral, and cardiovascular diseases were evident from the current research. Widespread consensus appears to be that certain components of e-cigarettes are hazardous to human health, and thus more research on these topics is required. Further knowledge can help implement more stringent regulations of these products.

44: Scale validation of mental health outcomes in college students

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Purpose

The goal of this project is to validate a scale for measuring mental health outcomes due to COVID-19.

Methods

The scale consists of 13 items measuring various aspects of mental health issues arising from COVID-19. It was administered to 145 dental students anonymously. Summary statistics, item and person reliabilities, dimensionality, item targeting and gender bias were assessed.

Results

Of the items evaluated, they showed excellent reliabilities (Item=0.97; person=0.86). The scale targeted the students very well, and was fairly unidimensional. All of the items were free of gender bias. Inter-item correlations were 0.89 on average (95% CI = 0.86 to 0.91), demonstrating good internal consistency.

Conclusions

The present study applied rigorous, advanced psychometric analysis to assess and validate a novel mental health scale that specifically measures COVID-19 outcomes in college students. The scale showed excellent measurement properties. It will be very valuable for evaluating the effectiveness of intervention programs that aim to improve students' mental health outcomes related to COVID-19 in the years to come.

45: Identifying Successful Strategies to Market Medication Therapy Management Services

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Author Affiliations

¹Roseman University, College of Pharmacy; ²Roseman University, Administration/Staff

Purpose

To determine which marketing methods yield the most completed pharmacist-led Medication Therapy Management (MTM) reviews.

Methods

We had used different marketing strategies in order to increase our MTM referrals between February 1, 2021, to October 31, 2021.

Results

We were able to obtain 51 unique patient referrals and 41 completed patient MTM appointments, showing an 80% completion rate for MTM services.

Conclusions

Our most successful outreach programs were internal referrals from our medicare call center and through small group presentations.

46: COVID-19 Variants, Vaccine and Booster

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Purpose

The purpose is to provide an overview of coronavirus infectious disease 2019 (COVID-19) variants, various vaccines formulations, immune protection and requirements for a booster dose. Clinical data on 1) vaccine-induced immune protection; 2) waning of immune protection against the emerging variants such as Delta and Omicron, and 3) recommendation for a booster dose to enhance immune protection.

Methods

COVID-19 related keyword search and review of primary and tertiary literatures available in medRxiv, PubMed, CDC and NIAID databases were employed. The search specifically focused on COVID-19 vaccine clinical trial data, real-world protection data, vaccination, emergence of variants of concern (VOC), waning of immune-protection, and recommendation for a booster.

Results

COVID-19 vaccine clinical trial data and real-world data shows strong and durable humoral and cellular immunity with high degree of protection against infection. But durability of vaccine-induced immune protection started waning after about 6-months from vaccination. Waning immunity combined with low vaccination perhaps led to generation of VOC such as Delta and more recent Omicron. Clinical data suggest that these vaccines provide decent protection against the worrisome emerging variants preventing hospitalization and death.

Conclusions

Development and release of safe and effective COVID-19 vaccines and recommendation for a booster dose have been accomplished. Successful control of the pandemic to go back to pre-COVID normal life will require increased immunization globally and building a herd immunity world-wide.

47: Scoping Review of Tele-dentistry Implementation During Covid-19

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Purpose

Covid-19 started in Wuhan, China in December 2019 and quickly became a global pandemic despite the lockdown in Wuhan to contain the outbreak. The virus rapidly spread via human-to-human contact via aerosol droplets from infected individuals coughing, sneezing, and even speaking. The dental profession is at high risk of contracting the virus since their work includes working in the oral cavity and most treatment procedures produce aerosols. One way to reduce the risk is by reducing the number of patients going to the emergency department and dental offices, and tele-dentistry emerged as a key factor in triaging patients. Tele-dentistry utilizes technology to help dentists communicate and provide care without direct contact with patients. The purpose of this research study was to examine strategies and implementation of tele-dentistry during the pandemic beginning at the lock-down in March 2020 to the present.

Methods

We conducted a scoping review to search for articles in PubMed with search terms including “teledentistry,” “tele-dentistry,” “covid-19,” “coronavirus,” “tele-health,” “telemedicine,” and “dentistry.” Inclusion criteria were articles published from March 2020 to present time. To effectively evaluate implementation of tele-dentistry starting from the lock-down, articles in English and articles relevant to the dental field and its specialties were included.

Results

After excluding articles that did not pertain to our research, a total of 22 articles were included in our study. We expect to have an overview of how tele-dentistry was executed with the sudden lock-down. The results will also evaluate any challenges in setting up and performing tele-dentistry and include innovative ideas to overcome the challenges.

Conclusions

This study hopes to highlight innovative techniques and strategies to effectively perform tele-dentistry. This will be useful for the ongoing pandemic with peaks from variants of Covid-19. It may also have applications in extending care to areas where patients cannot readily seek treatment from dental professionals.

48: COVID-19 Therapeutics: Current and Emerging therapies

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Purpose

The emergence of a novel respiratory disease in late 2019 prompted the pharmaceutical industry to develop multiple therapeutic strategies to combat the disease. The current therapies include vaccines, antiviral drugs, monoclonal antibodies, etc. In addition, supportive care measures such as ventilation and fluid management are also used in critically ill and hospitalized patients. The aim of this work is to describe all the currently available treatment strategies for COVID-19 patients as well as highlight the emerging therapies. In addition, we would also like to discuss the various formulation approaches to the current and emerging therapies for COVID-19.

Methods

Though traditional drug discovery takes many years to decades to complete, it is often beneficial to bring a new drug to the market by repurposing existing drugs that have similar mechanisms of action. Additionally, repurposed drugs have less cost associated to manufacture, testing, and finally getting regulatory approval from the FDA. Also, repurposed drugs have previously documented toxicity and safety profiles that may speed up the approval process. An exhaustive search revealed that (as of February 2022), there are over 500 therapeutic drugs and over 200 vaccine candidates that are being tested for COVID-19. Additionally, over 400 drug candidates and over 90 vaccine candidates are currently undergoing human trials.

Results

N/A

Conclusions

There has been a continuous evolution of treatment strategies as new therapies emerge and it is beneficial to compare all treatment options to better understand and combat the disease.

**Scholarship of
Teaching and Learning
Abstracts**

49: Impact of COVID-19 on Vulnerable Population: Role of Social Support

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Purpose

The World Health Organization declared the Coronavirus (COVID-19) outbreak a pandemic on March 11th, 2020. Social distancing and stay-at-home sanctions were part of the efforts to decrease the spread of the virus. Isolation from family and friends and the social atmosphere became a common ground for the community. Social support was impacted by the need to limit social interaction. The impact on vulnerable populations such as the children emphasized the importance of the role of social support in promoting well-being and healthy behaviors. The changes in the delivery of education from school to the home environment make it challenging for disadvantaged families to effectively provide social support amidst the pandemic.

Methods

Social Support Concept: Social support entails that a dependable individual or group of people provide support. The support involves being available for the other person. Social support comes in different forms and may either be perceived or received. Perceived social support refers to one's personal feelings while received social support is based on objectivity. Social support may also facilitate coping by strengthening people's ability to realistically appraise stressful events and develop alternative coping strategies. Numerous other studies show a relationship between social support and mental health.

Results

Vulnerable Population and Role of Nursing: Assessment of perceived social support or received social support among the vulnerable population is important in understanding how they are coping in stressful situations such as the current pandemic. Available advanced technology can be wisely utilized to assist the vulnerable population cope with social isolation. Individuals who are confined in the hospital due to COVID19 were initially isolated from their families due to the pandemic restrictions. Nurses find ways to allow social interaction between hospitalized patients and their families through electronic devices.

Conclusions

Implications in Nursing: Nurses have a significant impact on the client's well-being, especially during this pandemic. A vulnerable population presents a greater need to maintain and promote one's health. The role of social support in meeting the vulnerable populations' demand for healthy outcomes must be incorporated into the nursing process. The ability to obtain social support in this unprecedented time is yet another focus of research.

50: Growing Leaders during COVID19 Global Pandemic and Formation of Minority Student Nurses Association: Impact on Minority Leadership Representation in the Nursing Workforce

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Purpose

The increasing racial and ethnic diversity of students in the United States nursing programs is a high priority as agreed by national nursing and healthcare organizations including the National League of Nursing (NLN), American Association of Colleges of Nursing (AACN), Institute of Medicine (IOM), and the American Nurses Association (ANA). By increasing recruitment and improving retention and graduate rates of minority nursing students, nursing programs could facilitate increased minority representation in the nursing workforce.

Methods

The Asian American Pacific Islander Nurses Association of Nevada (AAPINA of NV) established in March 2018, strives to positively affect the health and well-being of the community by supporting nurses and nursing students around the world through research, practice, and education. Successful efforts to encourage nursing students to actively engage in community outreach were evident during COVID19 global pandemic. The formation of AAPINA RUSNA and AAPINA CSN SNA have grown future nurse leaders out of student nurse associations. .Servant leadership is embedded in the process of SNA formation with taking the traditional power leadership model and turn it completely upside down, the members at the very top and the leader at the bottom, charged with serving the members above them.

Results

AAPINA RUSNA created, established, and maintained a Food Pantry for nursing students who are on-campus while attending classes, studying, preparing, and taking assessments. This project provided snacks and drinks for all nursing students and assistance to working students who were laid off from full-time or part-time jobs due to the COVID19 pandemic. AAPINA CSN SNA distributed face masks and face shields to the local frontliners during the shortage. Students volunteered in a drive-up flu clinic and family food distributions at the Las Vegas China Town and provided over 1,000 frozen family meals in the community.

Conclusions

Nursing students who were involved in community organizations reported higher levels of empowerment. Self-directed learning readiness and self-esteem contributed significantly to the variance in empowerment. By creating an environment through modeling, nursing students can grow into future leaders who are creative, innovative, caring, and compassionate even amidst of a global pandemic.

51: What It Means to Be a Fulbright Scholar: A Life-Changing Experience

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Purpose

“The Fulbright Program is a once in a lifetime opportunity, and being a Fulbrighter is not only a stamp or approval, it’s a stamp of excellence.” This presentation will address individual experiences from the decision to apply for the Fulbright Scholarship to the application process, and ultimately to the acceptance and implementation of the program in a foreign country, specifically, Uganda, Africa, and India. A brief introduction of the country, specific needs as well as its unique cultural characteristics will be discussed.

Methods

Fulbright Scholar Program provides opportunities for the faculty for professional collaboration in teaching, research, or both. The opportunities to nursing faculty to be a Fulbright Scholar are lower than those in other disciplines. In fact, application for a nursing faculty falls under Public/Global Health category. The opportunities for a Pharmaceutical Science faculty to earn a Fulbright Scholarship is also limited in ‘Biological Sciences’ education area.

Results

Revelation of the similarities and differences in curricular design, development and delivery, struggle of students and faculty members in a foreign country and the unique cultural characteristics compared to US academic institutions’ student and faculty are important aspects of Fulbright experience that allowed us to learn and adapt. The Fulbright Program awards approximately 8,000 grants annually that includes roughly 2,000 U.S. students, over 800 U.S. scholars, and 900 visiting scholars.

Conclusions

As US Fulbright Scholars, we aspire to continue participating in cultural exchange and global outreach programs available through the U.S. Department of State. It is our hope that our stories and experiences would encourage fellow Roseman colleagues (and in academia) to apply for a Fulbright Scholarship to pursue a rich, life-time experience as a volunteer in a foreign country. This will as well improve cultural competency and also share learned common values and insights to bring them back to our own academic institution.

52: The Implementation of Telehealth Scenarios and COVID-19 Training to Prepare Nurses for the Future of Healthcare

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Purpose

The purpose of creating telehealth scenarios, and the implementation of COVID-19 training, was to prepare undergraduate nursing students for the future of healthcare and the delivery of care using telehealth. Students were provided the opportunity to engage in: •Assessing a client using telehealth communication techniques •Developing and utilizing communication strategies •Practicing the use of correct nasal swabbing for the collection of COVID-19 screenings •Assessing lung sounds utilizing a COVID-19 lung simulator

Methods

Students in groups of 4-8 completed four stations that included the following scenarios: •Interviewing a client via telehealth • Assessing signs and symptoms of a client via telehealth •Implementing a COVID-19 algorithm via telehealth •Educating the client regarding the signs and symptoms of COVID-19 and associated CDC guidelines •Correct technique and testing procedures for COVID-19 Additionally, each group of students was exposed to a high-fidelity simulation of a COVID-19 high-risk hospital admission. By the completion of high-fidelity simulation students were able to: •Recognize and assess a client with signs and symptoms of COVID-19 •Practice interdisciplinary team safety •Apply appropriate PPE standards and equipment •Communicate with the interdisciplinary team using SBAR.

Results

Survey results for the telehealth scenarios (N=71) indicated that post scenarios, the majority of nursing students were: •Comfortable to very comfortable: using telehealth technology, assessing clients using telehealth communication techniques, and using strategies to overcome client barriers to participate and respond during telehealth encounters. Survey results for the training related to the use of the COVID-19 simulators (N=46) indicated post scenarios/training, the majority of nursing students were: •Comfortable to very comfortable: performing nasal swabbing for the collection of COVID-19 screenings, and the assessing of lung sounds of a COVID-19 client.

Conclusions

Nursing education needs to embrace the use of technology in the preparation of students for the current and future delivery of healthcare. By the utilization of telehealth scenarios, and COVID-19 simulators, nursing students were afforded “real life” application of knowledge and skills in a controlled practice environment. In order to continue to meet the challenges of preparing holistic healthcare providers, innovative learning strategies and technological modalities will need to be embraced by the profession of nursing.

53: An examination of novel therapeutics in dry eye disease.

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Purpose

Dry eye disease is a prevalent disease state for which a multitude of novel therapeutic strategies are being developed. Traditional therapies include immune-suppressing medications like Xiidra or Restasis, topical corticosteroids like FML and Flarex, and over-the-counter options like artificial tears. These traditional therapies can be limited in their use and may come with side effects that prevent their widespread use. The purpose of this comprehensive and systematic review is to examine novel therapeutic strategies for dry eye disease. These new therapies may be considered in the future as first-line options for combating the discomfort caused by dry eye disease and enhancing treatment for these patients.

Methods

PubMed and Google Scholar were used to investigate trials conducted within the past 5 years. Search terms used include “dry eye disease” and search limits including “randomized controlled trial” and “clinical trial.” These search criteria resulted in numerous articles relating to new therapy options for dry eye disease ranging from vitamin supplementation, novel delivery methods for already approved drugs, novel drug development techniques, and new non-drug therapy options.

Results

Initial search revealed 334 articles, which was narrowed down to approximately 25 articles to be reviewed. These articles identified several classifications of novel dry eye disease therapeutics including biopharmaceuticals, which include siRNA Tivanisiran and recombinant growth factor Oxervate, external devices, which include iTEAR 100 and TearCare, and traditional pharmaceuticals with novel targets, which include Visomitin, Novaliq, and varenicline. Further examination of emerging drug targets will be conducted to develop an overarching understanding of novel therapy options.

Conclusions

Results collected in this study will provide an understanding of future therapeutic options for dry eye disease. This will aid in development and planning for future clinical trials, as well as highlight novel drug therapy targets.

54: The effectiveness of an end-of-the-day oral quiz to improve the attendance and retention of knowledge in a three-year accelerated doctorate program of Pharmacy

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Purpose

The Roseman University of Health Sciences, College of Pharmacy (COP) is a three-year accelerated program. In contrast, most of the other pharmacy programs in the United States are four-year programs. A block system was adopted to overcome the fast pace schedule, in which students learn one subject at a time, for six hours per day, five days per week; they are assessed every alternate week. Active listening and learning in the classroom are essential to success in this program. This study will evaluate the efficacy of end-of-the-day quizzes, especially oral quizzes, in our accelerated Pharmacy program. Although a morning quiz is administered every day to assess the previous day's material, an end-of-the-day quiz may be beneficial, especially for those students who are distracted or unable to identify critical concepts that were covered. Secondly, a quiz may motivate them to stay in the class until the end. This study will also reveal whether an oral quiz has the edge over a written quiz since an oral quiz is interactive and more formative. Additionally, oral quizzes are rewarding since other students can witness an individual's preparedness, which may trigger motivation.

Methods

This study will be conducted during the first professional year of pharmacy school in a biochemistry course. Students will attempt an online Canvas quiz on the morning of each 8-hour day regarding the material taught the previous day. The class will be notified regarding the additional quiz. Student attendance will be tracked at the beginning and end of the class. After the assessment, we will also collect the student perception by administering an IRB-approved survey. The average correct answers of morning quiz scores will be compared to assess knowledge retention. We anticipate a difference in the morning vs. afternoon attendance. The differences in attendance will be compared in days where there was no end-of-the-day quiz, a written quiz, or an oral quiz.

Results

n/a

Conclusions

n/a

55: Emotional Intelligence Curriculum and the Impact on Dental Students

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Purpose

The purpose of this study is to understand the relationship between emotional intelligence (EI) curriculum and the development of emotional intelligence in second year dental students. Currently, there is no requirement for EI to be integrated into dental school curriculum. However, at Roseman University, EI is part of the dental schools' curriculum and is integrated throughout dental students' tenure. Based on the literature, EI is a skill that can be developed through education and can be fostered with the proper infrastructure. The assumption is dental students, and in turn dentists, with higher EI will have more success in practice. In addition, a dentist with higher EI will be more adept at handling intrapersonal conflicts, have more confidence, and higher well-being. The primary objective of the study is to determine the relationship between EI curriculum and Roseman second year dental students' (class of 2022) EI. A secondary objective of the study is to establish a baseline of EI prior to Roseman EI curriculum in first year dental students (class of 2024).

Methods

This study will be longitudinal and cross-sectional. The longitudinal portion will be before current second year dental students (class of 2022) take DMD 6100, and 6 months after the course. In this class, emotional intelligence theory is reviewed, and students can practice and apply the theory. The cross-sectional portion will be conducted with incoming dental students (class of 2024), before they take their first course, DMD 5100. This will provide a baseline for EI in Roseman first year dental students. Multi-Health Systems Inc. Psychological Assessments & Services (MHS Assessments) will be used as a third-party service to assess Emotional Intelligence using their EQ-i 2.0 instrument. The data has been de-identified, statistical analysis has been completed and final write-up and analysis is under way.

Results

Findings revealed no significant differences for Time, Gender, or Age on overall Emotional Intelligence from Pre- to Post-EI Total Scores.

Conclusions

Due to a small sample size (N=13) no conclusion can be drawn from the collected data. Additionally, COVID-19 is a major confounding factor to any results gathered.

56: Student Perception of Using Internet-based Quiz Programs for In-Class Active Learning: Kahoot or Poll Everywhere?

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¹Roseman University, College of Pharmacy

Purpose

To investigate the student perception of using the internet-based, quiz programs Kahoot and Polleverywhere for in-class active learning.

Methods

Kahoot and Polleverywhere were both utilized for active learning activities during the P1 class in PHAR 424 in Spring of 2021. Students in the class were asked to complete an internet-based, anonymous questionnaire soon after the completion of the block assessment, identifying their preference, delineating the thoughts of their selection. These results have been collected and are currently being analyzed.

Results

Results will be presented.

Conclusions

NA

57: Application and efficacy of color-coded learning models

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Purpose

This research is academic in nature and centers on the learning process in assessment-driven curricula. The study places particular emphasis on study guide-based learning, specifically color-coded models. The benefit of this model is that individualized learning takes the forefront: meaning students can customize their approach to what works for them. Having visual cues (i.e. consistency in colors) reinforces key concepts and can be applied across a variety of topics. This includes healthcare curricula; however, it is not limited to this field of study and can in fact apply to different areas of learning.

Methods

The researchers are in the process of IRB proposal and have derived a questionnaire that will be distributed to current P1 and P2 students. A ranking system has been established to gather information on several key facets of learning: how students learn, what students do to learn, and application of study guide-based learning models. Furthermore, the investigators included an open-ended question for students to provide their individualized learning preferences.

Results

This study is in-progress; IRB application and approval are required prior to data collection. Therefore, data/conclusions have not been derived as of yet.

Conclusions

This study is in-progress; IRB application and approval are required prior to data collection. Therefore, data/conclusions have not been derived as of yet.

58: RNPC: Educating Nursing Students for The Future of Healthcare Utilizing Interprofessional Collaboration

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Purpose

The purpose of the RNPC (Registered Nurse in Primary Care) Scholar initiative is to recruit and train nursing students and registered nurses, to practice to the full scope of their license in community-based primary healthcare teams. Thereby, increasing access to care, with an emphasis on disease prevention and control that includes mental health and substance use conditions. Overall, the scholar program aims to achieve a sustainable primary care nursing workforce that can address pressing national and global health concerns.

Methods

During years one, two, three, and four of the grant, the following processes were implemented: curricular enhancements were established within the designated courses; surveys were constructed and disseminated to practicing registered nurses on key primary healthcare topics that they would be interested in learning more information about; RNPC Scholars were recruited from incoming nursing classes; primary care clinical placements were established both in urban and rural locations; the education of faculty and students related to changes occurring at a national level, from an exclusive acute care educational preparation, to one that includes primary healthcare was implemented.

Results

Outcomes data have been gathered over the four years of the grant utilizing various research methods of collection including qualitative and quantitative approaches. Data collected from students, faculty, and registered nurses included surveys and focus groups. To date, the data supports the goals of the grant and the processes implemented.

Conclusions

Given the dynamic changing healthcare arena, it becomes imperative that future and current practicing nurses are prepared to meet the challenges associated with the provision of evidenced based quality care within this environment. This includes moving from an acute, episodic mode of healthcare delivery, to one that embrace primary care and engages clients in health promotion and disease prevention. By providing students with the knowledge and skills related to primary care, it is the hope that these students will chose to practice in primary care sites both within urban and rural communities.

59: Education and Experience Using Clear Aligner Therapy and 3D Technology in Graduate Orthodontic Residency Programs

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Purpose

The purpose of this survey is to understand the extent to which Orthodontic graduate students are being trained and educated in utilizing the latest technology available for the fabrication and Orthodontic treatment with clear aligners. This study may help identify the gaps in education for orthodontic residency programs regarding 3D technology involved in therapy with and fabrication of clear aligners. In addition, recommendations may be provided to incorporate courses addressing these areas in orthodontic residency education. This would help advance the competency of newly graduated orthodontists in 3D technology and its application to fabricate clear aligners.

Methods

Develop Survey 2. Distribute and Collect Survey Qualtrics used to compose and administer the survey The American Association of Orthodontists will distribute the electronic survey invitation (via Partners in Research Program) The survey will be active for a period of 2 months from the time of 1st invitation. A general reminder email will be sent out 2 weeks after the first invitation to increase participation 3. Analyze and interpret the results using the Statistical Package for the Social Sciences (SPSS) version 25.

Results

No results or conclusions have been made at this time because the data collection process is currently ongoing.

Conclusions

No results or conclusions have been made at this time because the data collection process is currently ongoing.

60: Developing a Learning Tool for Roseman Pharmacy Students- The Continual Evolution of Roseman Basics

Nicole Ventrello;¹ Taylor Taylor;¹ Mahdeed Raja;¹ Shannon Kinard;¹ Catherine Oswald;¹ Christopher So.¹

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Purpose

In July of 2021, Roseman College of Pharmacy (COP) launched a self-paced online course titled Roseman Basics (RB). This course was designed to introduce incoming students to various concepts prior to matriculating into pharmacy school, as well as provide resources once a student is enrolled. The primary purpose of this poster is to describe this Roseman Basics Course. Secondary points include identifying what other pharmacy schools have done as well as ways to improve the current course will be shared.

Methods

Members of the COP Curriculum Committee provided information regarding the evolution of the RB to the authors of this poster. The authors will perform general search query using search engines, such as Google Scholar and PubMed, using various keywords and phrases. Furthermore, published literature searches will be done seeking interesting strategies for the continued development of such a platform. Collected literature will be reviewed and compared to the RB course to identify potential ways to improve the course.

Results

This research is ongoing and not yet finished.

Conclusions

The conclusion is a work in progress and will include findings from the methods sections. All research will be concluded and reported upon by the Roseman research symposium.

61: A Retrospective Analysis of Underrepresented Minority and International Faculty in US Schools/Colleges of Pharmacy

Surajit Dey,¹ Omolola Adeoye-Olatunde;² Tessa Hastings;³ Kristine Willett;⁴ Jingjing Qian;⁵ Terry-Elinor Reid;⁶ Alok Bhushan.⁷

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Purpose

The critical need for a diverse faculty to help combat health disparities and racial inequities is widely recognized. Schools and Colleges of Pharmacy (SoP/CoP) in the US are not immune to the lack of underrepresented minorities in faculty ranks. This study's objective was to characterize the demographics of US SoP/CoP faculty, particularly underrepresented minority (URM) and international/foreign groups.

Methods

This was a retrospective, descriptive cross-sectional analysis using the AACP Institutional Research data from 2015-2019. Domestic full-time faculty were identified and categorized as 1) URM; 2) White; 3) Asian; and 4) other. URM was defined as faculty who are Black or African American, Hispanic/Latino, American Indian, Alaska Native, Native Hawaiian, or other Pacific Islander. Race and ethnicity are not reported for international/foreign faculty. Descriptive statistics were used to characterize the distribution of different racial/ethnic and international/foreign groups.

Results

Data from all SoP/CoP in the US were included in the analysis. From FY2015 to FY2019, the number of URM faculty increased from 479 (7.7%) to 552 (8.8%) an increase of 1.1%. The number of White faculty decreased from 4235 (68.1%) to 4151 (66.1%). The proportions of Asian and international/foreign faculty increased from 917 (14.7%) to 999 (15.9%) and from 202 (3.2%) to 240 (3.8%), respectively.

Conclusions

There is a need to study the representation and support the recruitment of diverse URM faculty in US SoP/CoP. This study provides the most current snapshot of URM and international/foreign faculty within the last 5 years and with respect to pre-COVID-19. Future studies should explore the potential impact of the COVID-19 pandemic on URM and international/foreign faculty in US SoP/CoP and identify actionable recommendations for promoting diverse faculty recruitment and support.

62: A Retrospective Analysis of Underrepresented Minority and International Graduate Students Schools/Colleges of Pharmacy

Surajit Dey,¹ Tessa Hastings;³ Omolola Adeoye-Olatunde;² Kristine Willett;⁴ Jingjing Qian;⁵ Terry-Elinor Reid;⁶ Alok Bhushan.⁷

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Purpose

Recruitment, retention, and support of a diverse graduate student population in Schools/Colleges of Pharmacy (SoP/CoP) is critical to producing innovative and representative leaders in pharmaceutical sciences. The objective of this study was to characterize demographics of US SoP/CoP graduate students.

Methods

This is a retrospective, descriptive cross-sectional analysis using the AACP Institutional Research data from 2015-2019. Domestic students are categorized as 1) Underrepresented minority (URM); 2) White; 3) Asian; and 4) other. URM was defined as Black or African American, Hispanic/Latino, American Indian, Alaska Native, Native Hawaiian, or other Pacific Islander students. Race/ethnicity are not reported for international/foreign students. Descriptive statistics were used to characterize the distribution of different racial/ethnic and international/foreign groups.

Results

During the study period (2015-2019), URM PhD and MS students increased from 216 (6.6%) to 284 (8.8%) and from 92 (8.2%) to 132 (11.1%), respectively. However, the number of international/foreign PhD and MS students decreased from 1679 (51.0%) to 1565 (48.6%) and from 660 (58.6%) to 572 (47.9%), respectively. The numbers of White and Asian students enrolled in PhD programs remained similar from 2015-2019, however the numbers of White and Asian MS students increased from 239 (21.2%) to 305 (25.6%) and 101 (9.0%) to 131 (11.0%), respectively.

Conclusions

The proportion of URM graduate students enrolled in SoP/CoP increased between FY2015-FY2019; however, the proportion of international/foreign graduate students decreased. Future studies should explore the potential impact of the COVID-19 pandemic on graduate student diversity in SoP/CoP and identify additional factors contributing to and recommendations to support URM graduate student recruitment.

63: Interprofessional (IPE) activities and interactions - a comparison of didactic curriculum and rotation experiences

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Purpose

IPE is a required component for the accreditation of all health professional programs. While national organizations, Interprofessional Educational Collaborative (IPEC) and ACPE provide competencies and standards for IPE, there is a lack of IPE curriculum quality assurance. No validated assessment tools exist to evaluate the quality of IPE curriculum being delivered in didactic and experiential settings. At Roseman University College of Pharmacy (RUCOP), second-year students participate in 4 IPE activities per year in collaboration with other professional program (nursing and dental) and other local health professional programs (DO, PA, PT/OT, etc.) across two campuses. Students also participate in IPE activities during their third year while on their 6-week APPE rotations. As an initial step in evaluating the quality of the IPE curriculum, new IPE questions were integrated into APPE final evaluations to assess 1) the type of student IPE experiences while on rotations and 2) the medium for participating in IPE. Subsequently both IPE directors assessed each didactic IPE day for 1) type of IPE experience, and 2) medium for practicing IPE.

Methods

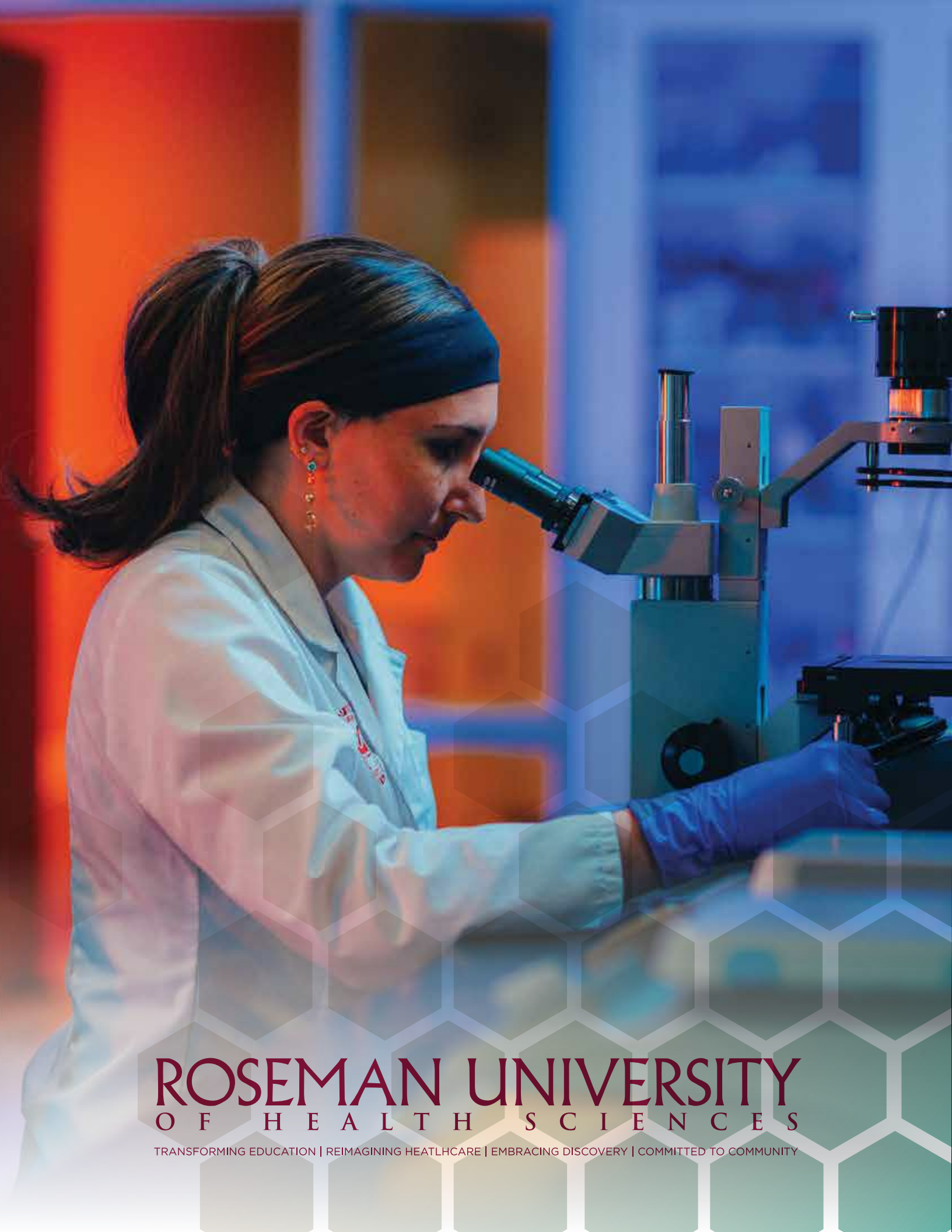
RUCOP's Experiential Team integrated new IPE questions into the Class of 2022 evaluations for three consecutive APPE blocks. Each survey consisted of a total of 13 IPE-related question items that asked students if they participated in a variety of interprofessional activities with other members of the healthcare team and the type of interaction (in-person, phone, electronic, or telehealth). A total of 303 surveys were completed over 18 weeks. RUCOP's IPE Directors evaluated their didactic 2020-2021 curriculum. Using the IPE activity types specified in the APPE evaluation, the Directors classified how many of those IPE didactic days (0-4) incorporated IPE experiential-related activities and if each didactic IPE day incorporated in-person, phone, or telehealth communications. Descriptive data analysis will be used for the reporting of this data.

Results

Pending

Conclusions

Pending



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