Evaluation

HR the Silent Partner: Building Teams & Tools for Better Recruitment and Hiring of Clinical Research Professionals

Elaine Fisher[1], Rebecca Thomas[2] and Jeb Williams[3]
[1]Emory University and [2]Emory Healthcare

ABSTRACT IMPACT: Improved non-biased matching of clinical research professionals to PI needs will accelerate time to active project engagement for new hires. OBJECTIVES/GOALS: An ongoing challenge for HR recruiters when matching applicants to open job positions is the time-consuming screening effort, which relies on imprecise semantic searching. We propose building a precision-based matching tool using Natural Language Processing to automate the accurate and non-biased identification of suitable job candidates. METHODS/STUDY POPULATION: We conducted 30-45' interviews with HR administration/recruitment specialists to delineate the recruitment and hiring process used to match CRC resumes to job descriptions (n=7). Next, CRC applicant resumes were evaluated by experts, first by independent review, followed by consensus and assignment of a final rating, 0= not qualified; 1= CRC1; 2= CRC2; 3= CRC3; 4= CRC4. Guidelines evolved after reviewing 6 batches of 50 unique resumes (300 total) and were based on applicant qualifications & experiences by job level, CRC 1-4. Using final guidelines an additional 3,145 resumes were rated. For uniform input into the NLP model, resume formats were converted and text contents extracted into multiple sections, i.e., education, professional experiences, etc. RESULTS/ANTICIPATED RESULTS: Guideline development: Rater agreement improved over time with poor agreement when no guidelines were present (.161- Kappa) to good agreement for final guidelines (.608- Kappa). Spearman's rho correlation between guideline iterations and Kappa is large and positive (rho 0.886) indicating significant rater agreement. NLP Model: Resume to job description matching indicated a third of applications were qualified, a third overqualified, and a third underqualified, suggesting the majority of applicants were unable to identify their 'best fit' by job level. Our NLP model matched the candidate resume to CRC level with 73.3% accuracy; and achieved 79.2% accuracy when matching the applicant resume to the CRC job description. Refinement of the NLP Model is ongoing. DISCUSSION/SIGNIFICANCE OF FINDINGS: A precision-based NLP matching tool will improve applicant targeting for the hire of great, qualified candidates. Improved applicant to job matching offers several advantages, i.e., reduced bias with greater diversity and inclusion; reduced time-to-hire; ability to anticipate training needs; and a reduced time to active project engagement.

Precision Medicine

Enhanced radiation therapy using chlorin-e6 conjugated gold nanoparticles*

Samir V. Jenkins and Robert J. Griffin
University of Arkansas for Medical Sciences

ABSTRACT IMPACT: Improved radiation treatment will yield higher doses at the tumor site, while reducing damage to healthy tissue, which will improve clinical outcomes. OBJECTIVES/GOALS: Development of gold nanoparticles covalently linked to a photosensitizer for use to enhance radiation therapy. The particles will be thoroughly characterized and the mechanism uncovered. The efficacy of these particles will be tested in a murine system. METHODS/STUDY POPULATION: Gold nanoparticles were synthesized and coated with amine-terminated poly(ethylene) glycol then covalently conjugated to chlorin e6, a known, FDA approved photosensitizer. The system was characterized using UV-Vis spectroscopy, transmission electron microscopy, and nanoparticle tracking analysis. The generation of reactive oxygen species following X-irradiation was measured. Enhanced cell killing was measured clonogenically and in vivo efficacy and tumor pathology was assessed in a murine system. Further studies will determine the optimum combination of particle shape, photosensitizer structure, and ratio of components, as well as the optimal dosing schedule. RESULTS/ANTICIPATED RESULTS: Conjugation of the particle to the photosensitizer was successfully achieved, and the molecule was detectable by UV-Vis spectroscopy. TEM and NTA showed no aggregation of the particles, and an increase in reactive oxygen species generation was observed. The conjugates significantly increased cell killing during radiation treatment, while neither the particle alone or the photosensitizer significantly affected clonogenic survival at the same concentrations. Pathology of breast tumors grown in immunocompetent mice showed a significant increase in necrotic tissue following a single 20 gy treatment when the conjugate was present. DISCUSSION/SIGNIFICANCE OF FINDINGS: Radiation therapy is widely used clinically and it is a highly localized form of treatment. However, the total dose of radiation is limited largely to prevent injury to adjacent normal tissue. This conjugate has the potential to increase the effective dose in the tumor thereby reducing damage to healthy tissue and providing a more effective therapy.

T1-T4 in 3 (Minutes)

Sharon Croisant, MS, PhD, Alisha Goldberg, John Prochaska, DrPH, Chantele Singleton, MS, MBA, Krista Bohn, MPH and Lance Hallberg, PhD
University of Texas Medical Branch

ABSTRACT IMPACT: The purpose of the T1-T4 in 3 Minutes program is to improve trainees' capacity for communication of complex to a non-scientific audience as well as to ensure that our community stakeholders have access to, and understanding of, ongoing clinical and translation research OBJECTIVES/GOALS: The T1-T4 in 3 Program: o Increases knowledge of research across institution; o Increases capacity of trainees to convey complex science to lay audiences, funders, colleagues, and the media; o Increases health and scientific literacy; o Bridges gaps between trainees and potential entrepreneurial mentors METHODS/STUDY POPULATION: T1-T4 in 3 (Minutes) is an adaptation of the University of Queensland's Three Minute Thesis competition in which PhD students present their thesis in 3 minutes or less to a lay audience. The competition enables them to cogently communicate their ideas and research findings to a non-specialist audience. Our adapted version, T1-T4 in 3, requires a presentation in three minutes or less to a lay audience, but rather than a thesis, the topics are on trainees' research, and in this particular case, an idea for a commercial venture. The competition provides awards for the first- and second-best projects as determined by a panel of judges, and a 'people's choice' award determined by a lay audience. RESULTS/ANTICIPATED

RESULTS: This exercise is anticipated to improve trainees' capacity for communications as well as ensure that community stakeholders and research and business community partners have access to, and understanding of, ongoing clinical and translation research with potential commercial applications. Further, the increased ability of our faculty and trainees to effectively communicate complex science to the public and other audiences" including potential funders" supports additional stakeholder dissemination mechanisms by increasing their confidence in their abilities to converse with non-specialists about their research, thus increasing the likelihood of participation in other community-based activities. DISCUSSION/SIGNIFICANCE OF FINDINGS: To increase ITS commercialization efforts, we envision involving numerous external partners to educate, fund, and support new ventures. T1-T4 in 3 judges will include commercialization scholars from regional and national institutions as well as pharmaceutical entities and regional angel investors.

Team Science

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Translational Fellows as a mechanism to improve throughput of university technology commercialization

Everett G. Hall, Tom M. Krenning and Michael S. Kinch
Washington University in St. Louis

ABSTRACT IMPACT: This work aims to identify best practices for university-based asset development programs to improve commercialization throughput, which in turn will drive innovation in the biomedical space and directly contribute to improved human health. OBJECTIVES/GOALS: University technology transfer exhibits a high rate of failure, often due to a lack of researcher experience or early-stage financial capital. The LEAP program at Washington University (WUSTL) was created to address these needs. The goal of this study is to assess the performance of LEAP against similar gap funds and further improve program operations. METHODS/STUDY POPULATION: The goals of LEAP are achieved by providing university inventors with individualized consulting and feedback from industry experts, as well as awarding funding to the most promising projects. To determine whether these activities are impactful, we distributed an awardee report form to collect data on all funded LEAP projects, and then combined the results with project registration information. We also collected records Office of Technology Management, including invention disclosures, licenses, and startup creations. The resulting dataset was used to calculate program metrics and then evaluated against comparable gap funds. Sentiment data from participant surveys were also analyzed to assess perceived program value and knowledge transfer. RESULTS/ANTICIPATED RESULTS: As of the Sp2020 cycle, LEAP has funded 76 projects. Resubmitted projects had a funding rate of 52%, vs. 34% for new projects. Of the startups founded off of WUSTL intellectual property since 2016, nearly two-thirds had previously participated in LEAP. Funded LEAP projects also had a 29% licensing rate, which is comparable to similar gap funds. Lastly, participants self-reported an increase in knowledge across a range of commercialization areas. DISCUSSION/SIGNIFICANCE OF FINDINGS: The increased repeat funding rate and self-reported knowledge suggest that LEAP is impactful in building commercialization proficiency. The licensing rate and prevalence of LEAP projects in WUSTL startups also indicate that LEAP is indeed promoting tech transfer. Together, these results suggest that LEAP could be a model for other institutions.

Data Science/Biostatistics/Informatics
Basic Science

16461

Comparison of voxel intensity standardization methods in head and neck cancer magnetic resonance imaging

Kareem A. Wahid, Renjie He, Brigid A. McDonald, Brian M. Anderson, Travis Salzillo, Sam Mulder, Jarey Wang, Christina Setareh Sharafi, Lance A. McCoy, Mohamed A. Naser, Sara Ahmed, Keith L. Sanders, Abdallah S.R. Mohamed, Yao Ding, Jihong Wang, Kate Hutcheson, Stephen Y. Lai, Clifton D. Fuller and Lisanne V. van Dijk
The University of Texas MD Anderson Cancer Center

ABSTRACT IMPACT: This work will standardize necessary image pre-processing for diagnostic and prognostic clinical workflows dependent on quantitative analysis of conventional magnetic resonance imaging. OBJECTIVES/GOALS: Conventional magnetic resonance imaging (MRI) poses challenges for quantitative analysis due to a lack of uniform inter-scanner voxel intensity values. Head and neck cancer (HNC) applications in particular have not been well investigated. This project aims to systematically evaluate voxel intensity standardization (VIS) methods for HNC MRI. METHODS/STUDY POPULATION: We utilize two separate cohorts of HNC patients, where T2-weighted (T2-w) MRI sequences were acquired before beginning radiotherapy for five patients in each cohort. The first cohort corresponds to patients with images taken at various institutions with a variety of non-uniform acquisition scanners and parameters. The second cohort corresponds to patients from a prospective clinical trial with uniformity in both scanner and acquisition parameters. Regions of interest from a variety of healthy tissues assumed to have minimal interpatient variation were manually contoured for each image and used to compare differences between a variety of VIS methods for each cohort. Towards this end, we implement a new metric for cohort intensity distributional overlap to compare region of interest similarity in a given cohort. RESULTS/ANTICIPATED RESULTS: Using a simple and interpretable metric, we have systematically investigated the effects of various commonly implementable VIS methods on T2-w sequences for two independent cohorts of HNC patients based on region of interest intensity similarity. We demonstrate VIS has a substantial effect on T2-w images where non-uniform acquisition parameters and scanners are utilized. Oppositely, it has a modest to minimal impact on T2-w images generated from the same scanner with the same acquisition parameters. Moreover, with a few notable exceptions, there does not seem to be a clear advantage or disadvantage to using one VIS method over another for T2-w images with non-uniform acquisition parameters. DISCUSSION/SIGNIFICANCE OF FINDINGS: Our results inform which VIS methods should be favored in HNC MRI and may indicate VIS is not a critical factor to consider in circumstances where similar acquisition parameters can be utilized. Moreover, our results can help guide downstream quantitative imaging tasks that may one day be implemented in clinical workflows.