determined by shear rheology will be tuned through concentration and polymer composition to mimic vaginal mucus. We will also show the facile movement of small molecule nutrients through the SHINE-VH network via sugar-binding and permeability tests. Additionally, we anticipate that the introduction of SHINE-VH, due to their xenobiotic nature as synthetic mucins, will modulate the microbiota by diminishing inflammation, thereby reinforcing the cervicovaginal mucus and cultivating a vaginal microbiome that is more resilient to the disruptive impacts of BV. Such modulation could lead to a marked difference between the SHINE-VH-treated and untreated groups. DISCUSSION/SIGNIFICANCE OF IMPACT: BV affects ~30% of women globally and is associated with severe gynecologic and obstetric complications, representing a significant unmet need in women's health. SHINE-VH offers a novel approach to BV management, aiming to strengthen vaginal mucosal integrity, potentially reducing BV prevalence, and improving women's health outcomes.

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A comparative approach to understanding the role of oncogenic MYC signaling in the metastatic osteosarcoma tumor immune microenvironment

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OBJECTIVES/GOALS: Osteosarcoma (OS) is the most common primary bone malignancy in humans and dogs. >40% of children and >90% of dogs succumb to metastatic disease. We hypothesize MYC overexpression in metastatic canine and human OS contributes to an immunosuppressive tumor environment by driving tumor-associated macrophage influx and T lymphocyte exclusion. METHODS/STUDY POPULATION: To characterize the role of oncogenic MYC signaling in the canine metastatic tumor immune microenvironment (TIME), 42 archived FFPE lung metastatic canine OS samples were evaluated for MYC copy number variation (CNV), mRNA, and protein expression via ddPCR, nanostring analysis, and immunohistochemistry (IHC). Seven samples also underwent GeoMX spatial profiling to more specifically evaluate T cell and macrophage transcriptional profiles based on MYC status. To determine the role of MYC target modulation as a potential therapeutic option, canine and human OS cell lines were treated with a novel MYC inhibitor (MYCi975) and assessed for effects on survival, proliferation, and cytokine profiles. RESULTS/ANTICIPATED RESULTS: We demonstrate that copy number gains are not a key driver of MYC hyperactivity in canine metastatic OS. However, stratification based on MYC protein expression demonstrates that "MYC-high" tumors are associated with downregulation of cytotoxic effector T-cell associated transcripts and upregulation of tumor-associated macrophage (TAM) and extracellular matrix remodeling transcripts. We also report that MYCi975 treatment of canine and human OS cell lines results in significant inhibition of OS cell survival and proliferation at concentrations that are pharmacologically achievable in mice. Furthermore, we demonstrate MYC inhibition by MYCi975 is associated with reduced pro-inflammatory cytokine secretion in OS cell culture models. DISCUSSION/SIGNIFICANCE OF IMPACT: While MYC overactivity in metastatic canine OS may not be genomically driven, other mechanisms that lead to increased MYC protein expression are associated with transcriptomic profiles supportive of local immunosuppression. Pharmacologic targeting of MYC may serve as a strategy to bolster immunotherapeutic options in metastatic OS treatment.

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Using social network analysis to power translational research collaborations

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OBJECTIVES/GOALS: Delving into the intricate web of translational research collaborations, this study analyzed the evolving landscape of the Hispanic Alliance of Clinical and Translational Research from 2020 to 2024 using cutting-edge social network analysis (SNA). SNA is a powerful tool for visualizing, understanding, and harnessing the power of networks. METHODS/STUDY POPULATION: We conducted a systematic document review of all the Alliance IDeA-CTR Network Calls for Pilot Projects from 2020 to 2024 including key attributes of the investigators and collaborators (e.g., academic institution, highest degree, collaborator type). Scientific collaboration was defined as two or more researchers working together in a grant proposal for a pilot project application. Study data was recorded and tracked using an Excel spreadsheet. R-Statistical software was used to analyze and map the networks resulting from collaboration interactions comparing the 2020 Call and 2024 Call. Network statistics were performed including nodes, isolates, edges, components, density, diameter, average degree, and the size of the main component. RESULTS/ANTICIPATED RESULTS: Within a vibrant network comprising over 150 investigators from local and national academic institutions, clinicians (49.3%), and basic researchers (25.4%) are predominant. Initial findings showcase a remarkable surge in interdisciplinary collaborations and affiliations over time. Preliminary findings demonstrated that the number of nodes/actors increased from 16 to 75 comparing 2020 to 2024 and the edges/relationships from 12 to 66. Notably, the number of translational research clusters surged from 4 to 18, with mentorship emerging as a critical conduit bridging diverse research clusters; 16 to 78 nodes in comparison from 2020 to 2024. More extensive collaborative clusters occurred across time with over 20 researchers collaborating. A mentor was the main actor connecting these research clusters. DISCUSSION/SIGNIFICANCE OF IMPACT: This study unveils the intricacies and power of translational research dynamics, showing a palpable surge in collaboration diversity and depth. By harnessing data-driven insights, our approach catalyzes informed decision-making to amplify collaboration, diversity, and network efficacy, offering invaluable guidance for policy and practice.

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ICTR data science initiative: Empowering translational teams to better leverage data science

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OBJECTIVES/GOALS: High-performing translational teams (TTs) effectively draw knowledge from empirical data to develop health solutions. However, some TTs lack rigorous data approaches, resulting in inefficiency. The ICTR data science initiative integrates

https://doi.org/10.1017/cts.2024.1152 Published online by Cambridge University Press

team-oriented data science for more innovative and reproducible translational research. METHODS/STUDY POPULATION: To help TTs better leverage data science, the Institute for Clinical and Translational Research (ICTR) at the University of Wisconsin-Madison orchestrated a strategic initiative involving four main actions. • Assess needs. Determine how TTs are using data science and identify essential tools for success. • Establish partnerships. Develop strategic relationships to centralize resources and engage data scientists. Provide team science training to ensure effective integration. • Develop educational pathways. Design and implement workshops to demystify novel data science tools and upskill translational scientists. • Facilitate culture change. Identify ways that all ICTR services can help identify needs, foster educational pathways, and encourage partnerships to help TTs better leverage data science. RESULTS/ANTICIPATED RESULTS: Initial assessments indicated that fewer than 25% of TTs receiving pilot awards used data science tools, and only 10% had a data scientist on their team. Data from collaboration planning sessions indicated that few TTs used data science, but all were interested in learning more. To address this deficiency, ICTR partnered with the Data Science Institute and the Section of Applied Clinical Informatics. This expertise informed resource development (e.g., a data science primer, websites) and generated workshops. Educational opportunities include tailored workshops to help TTs better curate data and create more efficient workflows, graduate course modules to improve rigor and reproducibility, and seminars illustrating translational applications of AI, visualizations, and large data integration. DISCUSSION/SIGNIFICANCE OF IMPACT: The ICTR Data Science Initiative was designed to empower TTs to more effectively integrate data to power translation. As data science approaches and expertise are embedded within teams, we anticipate continued increases in interest and usage of data science tools, collaborative publications, and data rich applications for extramural funding.

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An input-mechanism-outcome model to support integration of community health workers in primary care

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OBJECTIVES/GOALS: Community health workers (CHWs) are links between the community and healthcare. As primary care (PC) expands to address social drivers of health, CHWs are becoming part of PC teams, yet how the two integrate is not well understood. Using an input-mechanism-outcome (IMO) model, this research seeks to develop a model to expand CHW-PC integration efforts. METHODS/STUDY POPULATION: Participants were recruited from Roots Community Health Center (Roots), a CHC serving historically marginalized communities, that has successfully integrated a CHW role, Roots Health Navigators (RHNs), into PC services. The preliminary conceptual framework for this study was guided by an overarching IMO model and informed by social identity theory, team science, and the interprofessional care literature. A mixed methods study was conducted in three phases: 1) cross-sectional survey, 2) semi-structured interviews, and 3) model development. The survey identified team dynamics such as communication, trust, and shared understanding, and interviews explored how these collaborative teaming mechanisms take shape. Findings were merged into a final model of CHW-PC integration that was reviewed by Roots leaders. RESULTS/ANTICIPATED RESULTS: Survey results (n = 25) highlighted highly rated team dynamics including shared understanding and acting and feeling like a team. Qualitative findings (n = 10) described how integration occurred through complex interactions that were community-responsive and collectively reduced burnout among the team. Joint findings noted the importance of RHNs to continuity of care, building trust, and enhancing PC team effectiveness. Findings informed the development of a model of CHW-PC integration. This expanded on the preliminary conceptual framework by highlighting the dynamic relationship between mechanisms, processes, and team emergent states, as well as providing evidence to support feedback loops between inputs, mechanisms, and outcomes with overarching influence from the contextual setting. DISCUSSION/SIGNIFICANCE OF IMPACT: With a deeper understanding of the mechanisms of CHW-PC integration, findings informed the development of a model that can support other communities to replicate this approach to care and address critical patient needs. Teaming factors that sustain CHW-PC integration may be transferrable to other care teams integrating nontraditional roles.

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Fostering collaboration and innovation across the Clinical and Translational Science Awards (CTSA) Consortium

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OBJECTIVES/GOALS: The objective of the Clinical and Translational Science Awards (CTSA) Program Collaborative and Innovative Acceleration (CCIA) Award Initiative is to support synergistic collaborations to develop, demonstrate, and sustainably implement innovative solutions across and beyond the CTSA Consortium. METHODS/STUDY POPULATION: All CCIA awards between 2016 and 2022 were reviewed and analyzed by Fiscal year, activity code, and research area using NIH analytical tools and platforms. Subject matter experts categorized each award by research topics, study populations, stage of translational science, and innovation type. The number and type of collaborating organizations were noted and major accomplishments and expected outcomes were summarized. RESULTS/ANTICIPATED RESULTS: Between FY2016 and FY2022, NCATS funded 37 U01 and 18 R21 CCIA awards including >90 different public and private partnering organizations. CCIA awards spanned all stages of translation including preclinical (26%), clinical (36%), implementation (31%), and public health research (7%). Of the 55 CCIA awards, 31% focused on urgent public health needs and 25% were designed to address health disparities. Broadly, types of innovations included: Data science-related projects (18%), clinical care innovations (15%), biomarker or clinical outcome assessments (13%), digital health solutions (11%), therapeutic development (11%), therapeutic discovery (9%), education and training (7%), diagnostic tools (5%), software tools (5%), or tools for clinical research (5%). In total, >735 publications cited CCIA awards. DISCUSSION/SIGNIFICANCE OF IMPACT: For >8 years, the CCIAs have brought together researchers from diverse scientific disciplines across the nation to speed the development of new health solutions with broad impact. Advancements in genomic screening, for example, have led to policy changes while new delivery approaches have improved the quality of care for underserved populations.

https://doi.org/10.1017/cts.2024.1152 Published online by Cambridge University Press