RITN SM

RADIATION INJURY TREATMENT NETWORK

Past Informing the Present, Past Improving the Plan for a Rad/Nuc Incident

PROVIDED BY:

NATIONAL MARROW DONOR PROGRAM®

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SUPPORTED BY:

Office of Naval Research — ONR — Science & Technology

RITN PARTNERS:

American Society for Transplantation and Cellular Therapy

U.S. Department of Health & Human Services — REMM Radiation Emergency Medical Management — www.remm.nlm.gov

World Health Organization

ASPR — Assistant Secretary for Preparedness and Response

BARDA — Biomedical Advanced Research and Development Authority

REAC/TS — Radiation Emergency Assistance Center/Training Site

WMDA

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25 Years — acbb

NACCHO — National Association of County & City Health Officials

APBMT — Asia-Pacific Blood and Marrow Transplantation Group

U.S. Department of Health and Human Services — HRSA — Health Resources and Services Administration

AHLS — Advanced HAZMAT Life Support

EBMT — European Society for Blood and Marrow Transplantation

WBMT — www.wbmt.org

RadCCORE — Radiation Countermeasures Center of Research Excellence @ Duke School of Medicine

NATIONAL ALLIANCE FOR RADIATION READINESS

NP21827; JUL 2022

RADIATION INJURY TREATMENT NETWORK

RITN WORKSHOP EXHIBITOR

PARTNER THERAPEUTICS®

Workshop Overview

Title: Past Informing the Present, Past Improving the Plan for a Rad/Nuc Incident

Workshop Description:

The Radiation Injury Treatment Network seeks to increase the understanding of and preparedness for the medical, environmental, and psychological consequences of a mass casualty radiological/nuclear incident for healthcare professionals. The 2022 RITN workshop will (1) highlight recent developments in Covid pandemic response and applicable lessons we have learned, (2) review innovations in novel radiation countermeasures and dosimetry, (3) discuss optimizing triage and on the ground federal resources, (4) present strategies to ensure the availability and appropriate use of medical and psycho-social supportive care and resilience, and (5) explore applying telemedicine as a force multiplier for care and education. Additionally, the workshop will encourage open sharing of lessons learned from past efforts.

Target Audience:

Physicians and other healthcare providers, support staff, hospital and hospital system administrators, emergency managers, research scientists, and appropriate federal agency staff involved in radiation response and treatment of patients with radiation-induced bone marrow injury are invited.

Learning Objectives:

At the completion of this workshop, attendees will be able to:

1. Explain the challenges and new developments concerning patient transport, assessment and triage in pandemic response and review federal resources.
2. Discuss progress in research on radiation-specific countermeasures and injury, individual bio-dosimetry, and supportive care during mass casualty radiation emergencies.
3. Discuss challenges in effective communication during a health emergency and the role of subject matter experts.
4. Describe the importance and key challenges of operational planning and providing medical and psycho-social supportive care following a radiation/nuclear incident and how to improve resilience.
5. Understand how technology has presented a virtual alternative environment for clinical and educational platforms.
6. Describe key lessons learned from 15 years of preparedness activities.

National Marrow Donor Program (NMDP):

The NMDP facilitates unrelated marrow, PBSC and cord blood transplants. The NMDP also provides research, medical education and patient advocacy to extend and improve lives through innovations in transplantation.

Non-Endorsement of Products:

The opinions expressed in this workshop are those of the participating faculty. Approval of this workshop does not imply endorsement by the workshop providers or ACCME and ANCC of any commercial products discussed.

Speaker/Planner Disclosures

It is the policy of the providers of this program to ensure balance, independence, objectivity, scientific rigor and content that is free of commercial bias and outside the control of persons or organizations with an economic interest in influencing the content in all of its sponsored educational activities. Therefore, all planning committee members and speakers are required to disclose their relevant financial relationships and any or apparent conflicts of interest to the content of their presentations have been identified and resolved. The audience shall be informed of all relevant financial relationships, including the source of any commercial support for this forum.

RITN Workshop Planning Committee

Jen Aldrich, MA
NMDP/Be the Match

Nelson Chao, MD
Duke University

Valerie Eyerly
NMDP/Be the Match

Ann Jakubowski, MD
Memorial Sloan Kettering Cancer Center

Jay Johnson, Ed.D
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Liz Johnson
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Maria Moroni, PhD
Biomedical Advanced Research and Development Authority

Jill Tierney, MPH
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Julie Wilhauk, DNP
HCA Healthcare

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RADIATION INJURY TREATMENT NETWORK

Organizations Presenting

AABB: Association for the Advancement of Blood & Biotherapies

AAPCC: American Association of Poison Control Centers

ABA: American Burn Association

AFRRI: Armed Forces Radiobiology Research Institute

ASPR: Assistant Secretary for Preparedness & Response

BARDA: Biomedical Advanced Research and Development Authority

CDC: Center for Disease Control and Prevention

CEPAR: Office of Critical Event Preparedness and Response

DHHS: Department of Health and Human Services

DHS: Department of Homeland Security

DOE: Department of Energy

FEMA: Federal Emergency Management Agency

NCI: National Cancer Institute

NIAID: National Institute of Allergy and Infectious Diseases

NIH: National Institute of Health

NMDP: National Marrow Donor Program

NNSA: National Nuclear Security Administration

ONR: Office of Naval Research

REAC/TS: Radiation Emergency Assistance Center/Training Site

RITN: Radiation Injury Treatment Network

RNCP: Radiation and Nuclear Countermeasures Program

ROB: Radiation Oncology Branch

USU: Uniformed Services University

RADIATION INJURY TREATMENT NETWORK

Past Informing the Present, Past Improving the Plan for a Rad/Nuke Incident

August 4-5, 2022 | The Westin, Alexandria, VA

August 4, 2022 – Day 1		
7:30am	**Registration Opens**	Foyer D
8:00-9:00	**Breakfast**	Foyer D
Opening & Keynotes: Edison EFGD	**Session Chair: Cullen Case**	
8:30-8:45	Welcome	Jen Aldrich, NMDP/RITN
8:45-9:14	Keynote: Current State of Preparedness for Medical Surge from a Radiation Mass Casualty Incident (virtual)	LT R. Garrett Morgan (ONR)
9:15-9:44	Keynote: The Nuclear Emergency Support Team (NEST) Consequence Management Program (for actionable decision support in response to a radiological or nuclear accident or incident)	Randy Mieskoski (NNSA/DOE)
9:45-10:00	**Break**	
Partners: The Why & The How	**Session Chair: Ziad Kazzi**	
10:00-10:14	Preparedness and the National Blood Supply	John Hagins (AABB)
10:15-10:29	Poison Center Roles During the Pandemic – Addressing the Challenges and Applying to Radiological/Nuclear Incidents	Julie Weber (AAPCC)
10:30-10:44	Burn Community Preparedness Efforts for Mass Casualty R/N Incidents	James Jeng (ABA)
10:45-10:59	Overview of ASPR and Its Role in Response	Mary Homer (ASPR-BARDA)
11:00-11:14	New and Upcoming Tools and Guidance	Adela Salame-Alfie (CDC)
11:15-11:30	**Break**	
Partners: The Why & The How Cont'd	**Session Chair: Richard Harvey**	
11:30-11:44	Radiation/Nuclear Mass Casualty Producing Major Disasters: National Response and the RITN	Jonathan Gill (FEMA)
11:45-11:59	NIAID Development of Animal Models to Study Biomarkers and Efficacy of Medical Countermeasures Addressing Delayed Effects of Acute Radiation Exposure	Andrea DiCarlo (NIAID)
12:00-12:14	Expanding Access to Allogeneic Cell Transplant Through the Use of Mismatched Donors: The Donor For All Initiative	Stephen Spellman (NMDP)
12:15-12:29	Current and Future Activities of REAC/TS in Radiological/Nuclear Emergency Preparedness Measures	Adayabalam Balajee (REAC/TS)
12:30-1:30	**Lunch**	**Foyer D**
1:30-3:00	**Research Track: Edison ABD**	**Operations Track: Edison EFGD**
	Session Chair: Maria Moroni	**Session Chair: Jill Tierney**
	10 min. present/4 min. respond 1 question	14 min. to present
1:30-1:44	**Naduparambil K. Jacob:** Capture Collective MiRAD High-Throughput Radiation Biodosimetry Assay for Triage and Clinical Decision Making After Mass Casualty Radiological Events	**Racheli Ofir:** Placenta-Derived PLX-R18 Stromal Cells for Emergency Treatment and Prevention of H-ARS
1:45-1:59	**Richard Kowalski:** CytoRADx: A Quantitative Biodosimetry Test to Aid Medical Response to Large Scale Radiological Disasters	**Shannon Loelius:** US Department of Health & Human Services Biomedical Advanced Research and Development Authority's

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		Radiological/Nuclear Medical Countermeasures Program
2:00-2:14	**Mary Sproull:** Challenges in Translation of Biodosimetry Diagnostics to the Field	**Vijay Singh:** Identification of Novel Biomarkers for Acute Radiation Injury Using Multi-Omics Approach and Nonhuman Primate Model
2:15-2:29	**Sanchita Ghosh:** Development of Promising Radiation Countermeasures	**Lauren Finklea:** CRC SimPLER Modeling Scenarios of Critical Resources During Radiation Emergencies
2:30-2:44	**Rahul Goyal:** Machine Learning-Based Meta-Analysis of H-ARS Studies in NHP: Hematologic Myeloid Predictors & Confirmation of Leukine Benefit Across Myeloid Lineages	**Art Chang:** Use of National Poison Data System (NPDS) and Collaboration with Poison Control Centers
2:45-2:59	**Gregory Holmes-Hampton:** Mitigation of Total Body Irradiation-Induced Mortality and Hematopoietic Injury of Mice by a Thrombopoietin Mimetic (JNJ-26366821)	
3:00-3:15	**Break**	
3:15-4:45	**Research Track: Edison ABC**	**Operations Track: Edison EFGD**
	Session Chair: Nelson Chao	**Session Chair: Samuel Shartar**
	10 min. present/4 min. respond 1 question	14 min. to present
3:15-3:29	**Yujing Zou:** NT-I7, A Long-Acting Recombinant Human Interleukin-7, Enhances T Cell Reconstitution Following Total Body Irradiation	**Brittney Seiler:** The Path to ASPR's Regional Preparedness Model – Regional Disaster Health Response System (RDHRS)
3:30-3:44	**John L. Esker:** Verification of Alternative Animal Models for Acute Radiation Syndrome	**Mark VanDyke:** Changing the Command Center: How Lessons Learned Helped Shape a New Philosophy of Incident Management
3:45-3:59	**Vidya Kumar:** Development of a Partial Body Irradiation Murine Model to Evaluate Efficacy of Medical Countermeasures	**Al Villacara:** A Field Hospital in The East Meadow!?! Lessons Learned from the 2020 New York City Central Park COVID-19 Field Hospital Experience
4:00-4:14	**Michael Abend:** Molecular and Cytological Diagnosis of Acute Radiation Syndrome	**Rosemary McDonnell:** Radiological MCI: Black Swan or Gray Rhino? Preparing for Communicating the Unthinkable
4:15-4:29	**Andrew Phipps:** Prevention of Bacterial Infections Following Acute Radiation Exposure	**Jay Johnson:** Effective Information Sharing Through Collaboration
4:30-4:44	**Li Wang:** Deteriorative Effects of Radiation Injury Combined with Skin Wounding in a Mouse Model	
4:45-5:00	**Conclusion/Closing of Day One**	Research & Operations separate
5:00-7:00	**Networking Reception:** Cash Bar and Hors d'oeuvres	**Foyer ABC**

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August 5, 2022 – Day 2			
8:00-9:00	**Breakfast**	**Foyer D**	
Recap, General Sessions & Award: Edison EFGD		**Session Chair: Ann Jakubowski**	
8:30-8:44	Welcome Back		Jen Aldrich, NMDP/RITN
8:45-9:14	Radiological/Nuclear Incident Preparedness: Lessons Learned from the COVID-19 Pandemic		David Cassatt, NIAID
9:15-9:44	Leveraging the Regional Disaster Health Response System Telehealth Capabilities During a Marrow Toxic Injury Mass Casualty Incident		Jack Leeber & Eileen Searle, Massachusetts General Hospital
9:45-10:14	Using Lessons from COVID-19 to Advance Radiological/Nuclear Incident Response and Recovery Guidance, Tools, and Knowledge		Orly Amir, DHS
10:15-10:30	2022 RITN Capt. Robert Hartzman Memorial Service Award (virtual)		Cullen Case, NMDP/RITN
10:30-11:00	**Break**		
Wrapping It Up		**Session Chair: Jay Johnson**	
11:00-11:49	Welcome Back	Jen Aldrich, NMDP/RITN	
Closing Keynote		**Session Chair: Nelson Chao**	
11:50-12:19	Ukraine Under 2022 Russian Invasion: How Ready for a Nuclear Catastrophe is a Country That Has Previously Experienced a Large-Scale Radiation Accident (virtual)	Prof. Sergiy Klymenko, Feofaniya Clinical Hospital	
12:20-12:30	Closing of Day Two and Conclusion of Workshop	Cullen Case, NMDP/RITN	

RADIATION INJURY TREATMENT NETWORK

RITN WORKSHOP | ABSTRACTS AND SUMMARIES

Keynote Speakers:

Current State of Preparedness for Medical Surge from a Radiation Mass Casualty Incident

LT Garrett Morgan PhD, MSC, USN
ONR, Biological and Physiological Monitoring and Modeling

My presentation to the 2022 RITN Workshop, entitled "Current state of Preparedness for Medical Surge from a Radiation Mass Casualty Incident," will provide an update on ongoing efforts within the Office of Naval Research to provide resource support for RITN efforts to ensure nationwide preparedness for radiation mass casualty incidents.

The Nuclear Emergency Support Team (NEST) Consequence Management Program (for actionable decision support in response to a radiological or nuclear accident or incident)

Randy Mieskoski
NNSA/DOE

The Nuclear Emergency Support Team's (NEST) Public Health and Safety Mission supports Federal, State, local, territorial, and tribal authorities in response to a radiological or nuclear accident or incident. NESTs Radiation Emergency Assistance Center/Training Site provides world-renowned emergency response and subject matter expertise on the medical management of radiation incidents.

Partners:

Preparedness and the National Blood Supply

John Hagins
AABB/Midwest Blood Centers, Inc.

The Association for the Advancement of Blood & Biotherapies (AABB) is an international, not-for-profit association representing individuals and institutions involved in the fields of transfusion medicine and biotherapies. In January 2002, the AABB was designated as the coordinating body for the Interorganizational Disaster Task Force and charged with 1) ensuring blood collection efforts resulting from domestic disasters and acts of terrorism are managed properly, 2) delivering clear and consistent messages to the public regarding the status of the blood supply, and 3) identifying any infrastructure challenges and coordinating the transport of blood and blood products.

The task force includes representation from AdvaMed, ABC, American Association of Tissue Banks (AATB), American Hospital Association (AHA), American Red Cross (ARC), BCA, College of American Pathologists (CAP), National Marrow Donor Program (NMDP) and the Plasma Protein Therapeutics Association (PPTA) as well as liaisons from the Armed Services Blood Program and the U.S. Department of Health and Human Services/Office of the Assistant Secretary for Health, the Centers for Disease Control (CDC) and Prevention and the Food and Drug Administration (FDA). Through the network of members and liaisons, the task force immediately convenes during an emergency to estimate blood needs, assess the local blood supply, and provide the necessary blood resources for local treatment facilities.

Poison Center Roles During the Pandemic – Addressing the Challenges and Applying to Radiological/Nuclear Incidents

Julie Weber, RPh, CSPI
AAPCC/Missouri Poison Center

Poison Centers' established infrastructure and reliability allows for a nimble response to quickly adapt and respond as a partner with public health officials for disaster response and public health events. This presentation will describe how poison center toxicologists, specialists in poison information, and educators are integrated into disaster response and how the near real-time pandemic data findings from the National Poison Data System reinforce the utility of poison center signals that may be applied to radiological and nuclear incidents.

Burn Community Preparedness Efforts for Mass Casualty R/N Incidents

James Jeng, MD
ABA/University of California – Irvine

A) Burn disaster regionalization structure
B) Knowledge gap and efforts to close it
C) Increased socialization between RITN centers and burn units
D) Using the ABA RITN paper as a springboard for grant funding and future research

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Overview of ASPR and Its Role in Response

Mary Homer, PhD
BARDA/ASPR

ASPR is facilitating emergence from the COVID-19 pandemic and preparing for future emergencies. ASPR leads emergency support function #8, public health and medical services. It includes BARDA as a developer and provider of medical countermeasures; the National Disaster Medical System; and the Technical Resources, Assistance Center, and Information Exchange (TRACIE).

New and Upcoming Tools and Guidance

Adela Salame-Alfie, PhD, FHPS
CDC

This presentation will showcase the latest tools, training, guidance, and updates to the CDC Radiation Emergencies website to assist the medical and public health professionals in preparing and responding to a nuclear or radiological emergency. Also, during this presentation, we will briefly discuss CDC participation in the Cobalt Magnet 22 National Level exercise.

Radiation/Nuclear Mass Casualty Producing Major Disasters: National Response and the RITN

Jonathan Gill
FEMA

This presentation will briefly cover FEMA's planned operations during a mass casualty event involving radiological injuries. As well as, how FEMA utilizes the National Response Plan's Emergency Support Functions (ESF) to engage specialty resources like ESF-8 for the RITN.

NIAID Development of Animal Models to Study Biomarkers and Efficacy of Medical Countermeasures Addressing Delayed Effects of Acute Radiation Exposure

Andrea DiCarlo, PhD
RNCP/NIAID/NIH

While radiation-induced acute injuries during a radiological or nuclear emergency are of immediate concern, the delayed effects of acute radiation exposure (DEARE) must also be considered due to the chronic nature of inflammatory and other systemic dysfunction pathways set into motion at the time of the incident. DEARE injuries can encompass a broad range of organ damage spanning lung, kidney, cardiovascular, and brain, as well as residual or late-evolving damage to acutely-responding tissues like the bone marrow, gastrointestinal (GI) tract, and skin. Fortunately, there are now four products licensed by the U.S. Food and Drug Administration (FDA) to address hematopoietic (H) acute radiation syndrome (ARS). However, licensed approaches to treat acute GI injuries or DEARE are non-existent. Therefore, the Radiation and Nuclear Countermeasures Program (RNCP), within the National Institute of Allergy and Infectious Diseases (NIAID), National Institutes of Health (NIH) has made significant investments in the development of both small and large laboratory animal models, to meet FDA approval/licensure processes specifically required to address development of medical countermeasures (MCM) for chemical, biological, radiological, or nuclear threats. One aspect of the FDA's Animal Rule pathway for MCM approval/licensure stipulates that studies that cannot be carried out feasibly or ethically in humans must be conducted in "adequate and well-controlled studies" using at least one animal model that faithfully simulates anticipated human responses. In close collaboration with FDA and other funding agencies, RNCP support has been used to develop several rodent (mouse and rat) and large (nonhuman primate and minipig) animal models to address those sub-syndromes that occur after the first few weeks to months post-irradiation. For example, partial-body irradiation (PBI) models that allow for some survival from H- and GI-ARS are being used to establish biomarkers and develop drugs to treat late lung, cardiac, and kidney injuries. These irradiation protocols involve shielding a portion of the bone marrow, allowing for hematopoietic recovery at doses of radiation that would otherwise be acutely lethal, and long-term survival (to look for late effects). Similarly, minipig models such as the Göttingen strain, which have structural and other similarities with human skin, are favored for dermatologic injuries such as late-arising radiation-induced desquamation, ulceration, and necrosis. In addition, by observing late sequelae in survivors of H-ARS and GI-ARS exposed to total-body irradiation or PBI, investigators can better understand the long-term injuries that radiation can cause in the bone marrow (e.g., failure to properly reconstitute the niche) as well as chronic GI complications (e.g., inability to fully regain crypt/villus structures that are essential for nutrient absorption). These models also allow investigators to explore biomarkers of injury that present early in the course of disease that can predict severity of possible late effects. In summary, this suite of carefully-curated laboratory models has helped to accelerate development of approaches to address these kinds of delayed injuries, which would be anticipated during a radiological/nuclear public health emergency.

Expanding Access to Allogeneic Cell Transplant Through the Use of Mismatched Donors: The Donor For All Initiative

Stephen Spellman, MBS
NMDP

Allogeneic cell transplantation often represents the only curative treatment for various disorders, including acute radiation syndrome. Not all patients will have a matched family member or unrelated donor available. New transplant strategies can expand access by mitigating the risk of mismatched transplant ensuring a donor is available for all patients.

Current and Future Activities of REAC/TS in Radiological/Nuclear Emergency Preparedness Measures

Adayabalam Balajee, PhD
REAC/TS

Radiation Emergency Assistance Center/Training Site (REAC/TS) is a consequence management asset of US DOE/NNSA and REAC/TS provides 24/7 Medical advice/consultation on patient care including triage, decon, chelation therapy, assessment of injuries and absorbed radiation dose assessment. Some of our current and future activities in Rad/Nuc emergency preparedness measures will be highlighted in this presentation.

Research Track:

Capture Collective MiRAD High-Throughput Radiation Biodosimetry Assay for Triage and Clinical Decision Making After Mass Casualty Radiological Events

Naduparambil K. Jacob, PhD
The Ohio State University and Capture Collective

Capture Collective MiRAD high-throughput radiation biodosimetry assay for triage and clinical decision making after mass casualty radiological events.

Naduparambil K. Jacob PhD1,[2] *, Melanie Samsonow[1], Scott Barnes MS[1], John D'Orazio[1] and Mike Brown, Col, USAF (ret), MAS, MA[1]*

*Presenting authors

[1] Capture Collective Inc., Columbus Ohio-43214
[2] Department of Radiation Oncology, The Ohio State University College of Medicine, Columbus, Ohio- 43210, USA

Casualties from a radiological mishap or terrorist attack could expose a large number of humans to substantial doses of ionizing radiation. Depending on the absorbed dose, the onset of Acute Radiation Syndromes (ARS) and Delayed Effects of Acute Radiation Exposure (DEARE) will vary. Early quantitative detection of the absorbed dose is critical for timely administration of countermeasures and proper allocation of resources. Currently, there are no US Food and Drug Administration (FDA) approved tests or assays that allow early detection of substantial radiation injury and patient triage. Addressing the critical need, The Ohio State University, partnering with Capture Collective, is developing a finger-stick blood-based, high-throughput assay for radiation dose reconstruction with a goal of Â±0.5 Gy resolution at the critical dose range. Effects of radiation are measured using a pair of circulating microRNA biomarkers. Radiation dose-dependent changes in evolutionarily and functionally conserved miR-150-5p were internally calibrated with miR-23a-3p, which is non-responsive to radiation as it is not expressed at a significant level in blood cells. The assay demonstrates favorable kinetics and potential for a broad analytical range. Dose estimation of 0.5 -10 Gy within hours to a week after radiation exposure is possible with a sample to dose estimation within four hours. The efficacy of this practical high-throughput assay has been initially evaluated in a heterogenous mouse population after exposure to various sources of ionizing radiation including improvised nuclear device (IND) spectrum neutrons and gamma rays. We bridged the exposure after fractionated versus single dose in mice and further with humans exposed to fractionated radiation, demonstrating feasibility for dose reconstruction in humans. Clinical utility has been evaluated in blood collected from leukemia patients exposed to fractionated radiation indicating a dose dependent decrease of miR-150-5p. Capture Collective is an emergency management company, founded specifically for the advancement of biodosimetry research. Pivoting its nascent PCR capabilities at the outset of the pandemic to COVID testing, Capture proved its operational and scientific foundations and is now the largest provider of COVID testing in Hawaii. As we transition to the endemic phase, the team is now focused on developing and commercializing this groundbreaking biodosimetry assay to facilitate rapid clinical decision making that has remained unavailable to physicians confronted with radiological emergencies.

Reference: Two-miRNA based Finger-stick Assay for Estimation of Absorbed Ionizing Radiation Dose (2020), Science Translational Medicine 2020, Jul 15; PMID: 32669422

Funding support: The Ohio State University Comprehensive Cancer Center, Department of Defense Award no: W81XWH-15-2-0054 and NASA Award no: 80NSSC18K1691.

CytoRADx: A Quantitative Biodosimetry Test to Aid Medical Response to Large Scale Radiological Disasters

Richard Kowalski, PhD
ASELL, LCC

A large-scale radiation incident, such as detonation of an improvised nuclear device in a major city, would potentially expose millions of people to ionizing radiation. To provide the best care possible to these victims, the amount of radiation absorbed must be known. Results from biodosimetry tests need to be highly accurate across clinically relevant doses and reliable over days to weeks post-exposure to be useful for managing patient care.
We present performance test results of a biodosimetry system, CytoRADx, that quantifies the absorbed dose of radiation for up to 4 weeks after exposure using whole blood samples obtained from suspected radiation exposure victims. The CytoRADx System, which is based on the Cytokinesis Block MicroNucleus (CBMN) assay, comprises a standardized reagent kit, an optimized assay workflow, and a fully automated microscope and image analysis system â€“ a customized version of the MetaSystems Metafer platform, called RADxScanâ„¢. Quantitative dose estimation between 0 to 8 Gy is fully integrated and automatic within RADxScan, with no manual scoring or technician input required.

These advancements allow repeatable results to be obtained across different instruments, laboratories, test operators, and reagent kit lots, all without the need for lab-specific adjustments and calibration curves. This approach permits the effective use of a distributed testing network, providing significant testing capacity and accurate results to provide healthcare personnel with the quantitative radiation dose information needed to best manage the care of radiation exposure victims.

This project has been funded in whole or in part with Federal funds from the Department of Health and Human Services; Office of the Assistant Secretary for Preparedness and Response; Biomedical Advanced Research and Development Authority, under Contract No. HHSO100201700022C.

Challenges in Translation of Biodosimetry Diagnostics to the Field

Mary Sproull, PhD
NIH/NCI/ROB

Our work has centered on development of new dose prediction models for unknown received radiation dose using a proteomic approach. Using murine models to characterize novel biomarkers of radiation exposure, we have also developed models for dose prediction using both total body and partial body radiation exposures including organ specific exposures. In our latest work, female C57BL6 mice received either a total body exposure of 2, 3.5 or 8 Gy with plasma collection at days 1, 3 and 7 post-exposure, or an organ specific partial body exposure to only the brain, gut or lung at doses of 2 or 8 Gy to the lung or gut and 2, 8 or 16 Gy to the brain using a Pantak X-ray source. Blood samples were collected at days 1, 3 and 7 post-exposure for lung and brain and at days 3, 7 and 14 post-exposure for gut. All samples were analyzed for 1,310 protein analytes using the Somalogic SOMAscan assay, a highly multiplexed aptamer-based proteomics screening platform. Radiation exposure prediction algorithms were then constructed using these aggregated Somalogic data. For this study series, predictive models were developed using several treatment group combinations including (control vs. TBI only), (control vs. all pooled irradiated samples, which included TBI and all organ specific partials) and (control vs. each individual organ specific partial body exposure separately (brain, gut and lung). For each model, predictive algorithms were generated using both a Linear discriminant analysis (LDA) and Recursive PARTitioning tree (RPART) statistical methodology and separate murine sample cohorts were used for the training of each model and the testing of each model. Though the models which included TBI had relatively high overall predictive accuracies of 85%, and 89% respectively, the predictive accuracy of the (control vs. organ specific exposures) was only 59% and all the models which included partial body exposures performed poorly at differentiating control samples from partial body exposure samples. This reflects the challenges of using biomarkers to differentiate between samples from unirradiated animals and samples from animals receiving radiation exposures to relatively small percentages of body mass. Overall, these findings show that proteomic profiling can be a useful tool for development of predictive algorithms of radiation exposure, but that development of algorithms for field diagnostics should consider these inherent biological limitations. Our findings indicate that these dose prediction models have potential utility for mass population screening, but as most field exposures will be inherently heterogeneous, further research to support more robust biodosimetry algorithms is needed.

Development of Promising Radiation Countermeasures

Sanchita Ghosh, PhD
Armed Forces Radiobiology Research Institute, Uniformed Services University

BBT-059, a promising radiation countermeasure to protect military personnel in a potentially contaminated field

Sanchita P. Ghosh[1], Gregory Holmes-Hampton[1], Shukla Biswas[1], Christine Fam[2], George Cox[2] and Vidya P. Kumar[1].

[1] Armed Forces Radiobiology Research Institute, Uniformed Services University of the Health Sciences, Bethesda, MD 20889, USA
[2] Bolder Biotechnology, Boulder, CO 80301, USA

Chartered by the U.S. Congress in 1961, the Armed Forces Radiobiology Research Institute (AFRRI) is a Joint Department of Defense (DoD) entity with the mission of carrying out the Medical Radiological Defense Research Program in support of our military forces around the globe. As the only DoD facility dedicated to radiation research, AFRRI's Medical Radiobiology Advisory Team provides deployable medical and radiobiological subject matter expertise, advising commanders in response to a probable U.S. nuclear weapon incident and other nuclear or radiological material incidents.

There are five major research areas at AFRRI that encompass the prevention, assessment and treatment of injuries resulting from the effects of ionizing radiation: 1. biodosimetry; 2. low-level and low-dose-rate radiation; 3. internal contamination and metal toxicity; 4. radiation combined injury; and 5. radiation medical countermeasures. These research areas are supported by education to increase awareness of the detrimental health effects of ionizing radiation, in a mass-casualty scenario after a nuclear detonation or radiological accident.

BBT-059, developed by Bolder Biotechnology (BBT), is a long acting PEGylated IL-11 analog created using site-specific PEGylation technology. A single branched 40 kDa-PEG was added to the C-terminus of the protein at a cysteine residue (PEG-*179C). In this study, we demonstrate, for the first time, that BBT-059 is effective as a radiation countermeasure in CD2F1 mice when a single dose was administered from 24 h pre- to 24 h post-total body irradiation (TBI). In addition, we have shown that BBT-059 accelerated recovery from radiation-induced peripheral blood cytopenia, restored sternal bone marrow, protected bone marrow progenitor cells, gastrointestinal crypt cells, as well as attenuated protein biomarkers of H-ARS (hematopoietic acute radiation syndrome).

The data suggests that the drug could be developed as a novel radiation countermeasure for soldiers, which can be used either before or after radiation in the aftermath of a radiation event.

Disclaimer: The opinions and assertions expressed herein are those of the authors and do not necessarily reflect the official policy or position of the Uniformed Services University or the

Department of Defense. There are no conflicts of interest. (Supported by NIAID IAA and AFRRI Intramural Research).

Machine Learning-Based Meta-Analysis of H-ARS Studies in NHP: Hematologic Myeloid Predictors & Confirmation of Leukine Benefit Across Myeloid Lineages

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Objectives: There exists knowledge gaps in acute radiation syndrome (ARS) such as accurate quantification of absorbed radiation dose, biomarkers that can indicate tissue damage and recovery, and therapies to minimize tissue damage. Our study aimed to identify hematological biomarkers and their levels that are predictive of mortality due to hematopoietic ARS (H-ARS) using supervised machine learning (ML).

Methods: Longitudinal biomarker levels for 501 subjects from three 60-day prospective studies utilizing a non-human primate (NHP) total body irradiation (TBI) ARS model with minimum supportive care were analyzed. In these studies, complete blood counts were collected daily from days 1-30 post irradiation and every 3 days from days 30-60. Different biomarkers in the red blood cell (RBC) lineage – RBC counts, hemoglobin concentration, hematocrit, and reticulocytes – white blood cell (WBC) lineage – cell counts of leukocytes, neutrophils (ANC), lymphocytes (ALC), eosinophils (EOS), basophils (BASO), large unstained cells, and monocytes (MONO) – and platelets were collected. Random forest algorithm along with recursive feature elimination (RFE) and 5-fold cross validation (CV) was trained on each of three time windows – 4-9 days, 7-12 days, and 9-14 days post-irradiation – and cohorts – untreated animals and Leukine® (sargramostim, yeast-derived rhu GM-CSF) treated animals to predict 60-day mortality. Model performances were analyzed using area under the receiver operator characteristic curve (AUC), accuracy, sensitivity, and specificity. Shapley analysis was performed on the final models to visually identify biomarker thresholds predictive of mortality. All analysis was performed in Pumas 2.0 (www.pumas.ai).

Results: The data consisted of vehicle- (35%) and Leukine-treated NHPs exposed to LD70/60 (65%) and LD50/60 (35%) radiation doses. Approximately 95% of deaths occurred between days 12-24. RFE+CV provided an AUC greater than 0.7 and 3-12 optimal number of features in all scenarios. Shapley plots for each scenario showed that leukopenia, thrombocytopenia, and anemia (collectively pancytopenia) are important predictors of mortality. More specifically, WBC count was found to be predictive of mortality along with ANC. This implies that the broader WBC counts are critical to evaluate which include not just ANC, but also ALC, MONO, EOS, and BASO. Leukopenia- and reticulocytopenia-related biomarkers were important predictors in all time frames, however thrombocytopenia and anemia were more prevalent in 7-12- and 9-14-days windows. Also, Leukine-treated animals had lower cut-offs than control-treated animals – approximately 30% lower in WBC-related biomarkers and 70% lower in platelets – which means that blood counts in Leukine-treated animals had to drop further than untreated animals to trigger mortality.
Finally, AUC, accuracy, and specificity on test datasets were approximately greater than 70% implying adequate prediction performance.

Conclusions: ML analysis of data from 501 NHP exposed to TBI identified WBC to be predictive as an early marker for risk of death and WBC, platelets, and reticulocytes as important predictors beyond 7 days after exposure. The analysis confirmed the prominence of pancytopenia in H-ARS mortality and demonstrates ML provides a unique and objective method to analyze longitudinal data pooled from different studies for the discernment of biomarker-mortality relationship. These results can potentially facilitate development of medical countermeasures and inform efficient medical management of ARS.

Mitigation of Total Body Irradiation-Induced Mortality and Hematopoietic Injury of Mice by a Thrombopoietin Mimetic (JNJ-26366821)

Gregory Holmes-Hampton, PhD
AFRRI

Mitigation of total body irradiation-induced mortality and hematopoietic injury of mice by a thrombopoietin mimetic (JNJ-26366821)

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The threat of a nuclear attack has increased in recent years highlighting the benefit of developing additional therapies for the treatment of victims suffering from Acute Radiation Syndrome (ARS). In this work, we evaluated the impact of a PEGylated thrombopoietin mimetic peptide, JNJ-26366821, on the mortality and hematopoietic effects associated with ARS in mice exposed to lethal doses of total body irradiation (TBI). JNJ-26366821 was efficacious as a mitigator of mortality and thrombocytopenia associated with ARS in both CD2F1 and C57BL/6 mice exposed to TBI from a cobalt-60 gamma-ray source. Single administration of doses ranging from 0.3 to 1 mg/kg, given 4, 8, 12 or 24 hours post-TBI (LD70 dose) increased survival by 30 – 90% as compared to saline control treatment. At the conclusion of the 30-day study, significant increases in bone marrow colony forming units and megakaryocytes were observed in animals administered JNJ-26366821 compared to those administered saline. In addition, enhanced recovery of FLT3-L levels was observed in JNJ-26366821-treated animals. Probit analysis of survival in the JNJ-26366821- and saline-treated cohorts revealed a dose reduction factor of 1.113 and significant increases in survival for up to 6 months following irradiation. These results support the potential use of JNJ-26366821 as a medical countermeasure for treatment of acute TBI exposure in case of a radiological/nuclear event when administered from 4 to 24 hours post-TBI.

NT-I7, A Long-Acting Recombinant Human Interleukin-7, Enhances T Cell Reconstitution Following Total Body Irradiation

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Duke University

Total body irradiation (TBI) causes profound suppression of hematopoiesis and T cell depletion, increasing chances of infection. Currently, therapeutic options for improving recovery of the T cell compartment following radiation exposure are not available. Exogenous administration of IL-7 has been shown to increase peripheral blood (PB) T cell levels in mice and humans. However, this effect can be offset by the short half-life (< 0.05, CD8 PB and BM T cells; P < 0.001; SP8, NT-I7 (7.70 ± 1.44%) vs. vehicle (3.56 ± 0.39 %), P < 0.001;) which may be critical for mounting cytotoxic response against pathogen challenges. Furthermore, functional assays suggested that expression of both Granzyme B, a cytotoxic mediator and proinflammatory cytokines, IFN- and TNF-α, were preserved in NT-I7 group. Furthermore, proliferation capacity in response to TCR stimuli was also preserved in NT-I7-treated T cells. Altogether, we have demonstrated that NT-I7 enhances rapid induction of systemic T cell regeneration and preserves effector T cell functions. These findings indicate that NT-I7 as a promising therapeutic for significantly accelerating and enhancing T cell recovery after radiation exposure.

Verification of Alternative Animal Models for Acute Radiation Exposure

John L. Esker, PhD
HHS/OS/ASPR/BARDA

The development and advancement of radiological medical countermeasures (MCMs) are fundamental for establishing an effective response to radiological and nuclear threats. U.S. government agencies, such as the Biomedical Advanced Research and Development Authority (BARDA), the National Institute of Allergy and Infectious Diseases (NIAID), and the Department of Defense (DoD), have dedicated significant efforts to advance development and FDA approval of several cytokine MCMs to treat neutropenia and thrombocytopenia associated with radiation injury as well as to plan for their rapid availability in the aftermath of a mass casualty incident. Historical animal models for acute radiation syndrome (ARS) include mice, canines, and non-human primates (NHPs). However, as the use of canines and NHPs in scientific research raises social concerns, and as mice are unsuitable for repeated blood sampling, other large animal models are needed. While NHPs are the gold standard ARS model in pivotal studies for FDA approval under the Animal Rule, the NHP supply has become extremely limited due to the COVID-19 pandemic.

These initial models and therapeutics are now the foundation to support new advances in ARS models, new targets for therapeutics, and new interagency collaborations such as with the National Aeronautics and Space Administration (NASA). Injuries from ionizing radiation, whether by accident, therapeutic procedures, space travel, or by intentional mass casualty incidents, are likely to have important commonalities that include stem cell depletion, vascular injury, immune suppression, increased susceptibility to infection, and death. MCMs that address and mitigate radiation-induced injuries are the most important tools for countering the health consequences of radiation exposure in the future.

BARDA led the development and harmonization of rabbit and minipig ARS models as alternative large animal models to assess hematopoietic and vascular injury resulting in multi-organ failure and to test potential MCMs. The hematopoietic changes and organ dysfunctions observed after radiation injury in rabbits and minipigs were comparable to the murine and NHP total body irradiation ARS models that served to guide their development. These new models built upon the historic organ centric radiation injury models and transition to a more systems biology approach. Exposure of the total body to radiation clearly affects all organ systems simultaneously, and these multiple systems need to work synergistically with MCM administration to promote recovery after radiation exposure.

The size and blood volumes of rabbits (2.5-3.9 kg) and minipigs (9-15 kg) in the harmonized models allow for more extensive biomarker assessments, PK/PD sampling, and detailed determination of causes of mortality than could be obtained from mice. BARDA evaluated the performance of these alternative ARS models using Neulasta, an FDA approved MCM for acute radiation injury and demonstrated that rabbit and minipig neutrophil responses were similar to NHPs, indicating that they can be appropriate ARS models to support the development of MCMs under the FDA Animal Rule.

Minipigs and rabbits mirror clinically relevant aspects of radiation injury, show promise as acceptable ARS models, and demonstrate the potential to contribute significantly to MCM advancement. Together, these government-funded studies represent advances that can facilitate the emergence of cutting-edge technologies.

Development of a Partial Body Irradiation Murine Model to Evaluate Efficacy of Medical Countermeasures

Vidya Kumar, PhD
AFRRI

Exposure to ionizing radiation from nuclear events or radiological accidents often lead to major and harmful consequences to human health. Depending on the absorbed dose, the symptoms of Acute Radiation Syndrome (ARS) and long-term effects can appear within hours to months. Depending on the geography of exposure, one or more organs may be affected. Damage to the gastrointestinal system (GI) should be evident within days, which, usually requires a relatively higher dose than that needed to affect the hematopoietic system. Lung is a relatively sensitive organ; but the effects will not be apparent for months. Currently, there are four drugs approved for hematopoietic ARS but none to treat gastrointestinal or lung injury. We present the very first murine model with higher throughput to screen radiation countermeasures against partial body radiation (PBI) injury with the current focus on GI and lung injury.

In this model, C57BL/6 mice are irradiated using a linear accelerator (LINAC) at a dose rate of 2.75 Gy/min. The PBI was achieved by sparing 2.5% bone marrow by avoiding radiation exposure to tibia, foot and tail. A detailed dosimetry was carried out. Damage to GI has been characterized. Lethality curve has been generated to estimate LD50 dose of radiation. Damage to lungs has been established as a long term effect to the irradiated animals resulting in fibrosis using microCT scanning, histopathology and molecular assays. The model is being used to screen countermeasures targeted to GI at higher throughput than currently available models. The salient features of this model are detailed dosimetry, higher throughput, ability to evaluate short and long-term survival efficacy, and ability to assess multiple organ injuries using the same set-up. The views expressed here are those of the authors and do not reflect the official policy of AFRRI, USUHS, DoD or the US Government.

Molecular and Cytological Diagnosis of Acute Radiation Syndrome

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Bundeswehr Institute of Radiobiology

After a radiological or nuclear event, early and high throughput diagnosis of exposed individuals would be required to evaluate the extent of radiation injuries as quickly as possible and, when needed, initiate appropriate treatment. Biodosimetry could be applied for this purpose, but extrapolating from an absorbed dose to later developing severity of health effects is rather challenging. Complementary to that several approaches for predicting health effects have been developed and published by our group. Here, in principle, three clinically relevant groups must be identified during the initial steps of medical management. (1) The first group are individuals who believe they have been exposed, but have not actually received radiation doses and do not require medical care (so called “worried well”). The identification of these allows saving limited clinical resources. (2) Individuals exposed to lower radiation doses, who do not require immediate care. However, increased risk for late health effects demands surveillance over the next decades. (3) Highly dose-exposed individuals in need of early treatment and immediate hospitalization to maximise their chances of survival and recovery. In recently published studies we focused on early gene expression changes examined in the peripheral blood and on early cytological changes in blood cell counts (H-module App) with both predicting the later developing severity degree of the haematological acute radiation syndrome (H-ARS). These data and diagnostic tools will be shown herein.

Prevention of Bacterial Infections Following Acute Radiation Exposure

Andrew Phipps, DVM, PhD, DACVM
Tunnell Government Services supporting HHS/ASPR/BARDA

Given the lack of randomized controlled clinical studies to assess medical countermeasures for ARS, more scientific evidence is needed to support recommendations for medical management of ARS and associated infections resulting from a radiological or nuclear event. While current clinical practice guidelines recommend the administration of antibiotics to chemotherapy patients with febrile neutropenia, the clinical benefit of this practice is unclear for patients with acute radiation injury. A well-characterized NHP model of hematopoietic ARS was previously used to evaluate the efficacy of myeloid growth factors in combination with antibiotic monotherapy within 24-48 hours post-total body irradiation (TBI). In the previous study, NHPs continued to develop life-threatening bacterial infections even when G-CSF/GM-CSF was administered in combination with antibiotic monotherapy. In our study, we sought to investigate the occurrence of bacterial infection in NHPs with hematopoietic ARS by evaluating the efficacy of antibiotic combinations administered, without myeloid growth factors, to rhesus macaques following 7.4 Gy TBI. The study compared a combination of enrofloxacin/linezolid, enrofloxacin/cefepime, and enrofloxacin/ertapenem to enrofloxacin monotherapy. The primary endpoint was 60-day post-irradiation mortality, with secondary endpoints of overall survival time, incidence of bacterial infection, and bacteriologic culture with antimicrobial susceptibility testing. The combination of enrofloxacin/ertapenem significantly increased survival as compared to enrofloxacin monotherapy. Bacteria isolated from non-surviving macaques with systemic bacterial infections exhibited uniform resistance to enrofloxacin and variable resistance to beta-lactam antibiotics, linezolid, gentamicin, and azithromycin. Multidrug resistance was observed in Enterococcus spp. and Escherichia coli. We conclude that antibiotic combination therapies appear to be more effective than monotherapy alone but acknowledge that more work is needed to identify an optimal drug combination therapy, which will be critical in improving victim survival following a mass casualty nuclear or radiological event.

Deteriorative Effects of Radiation Injury Combined with Skin Wounding in a Mouse Model

Li Wang, MD, PhD
AFRRI/USUHS

Radiation combined injury (RCI) is radiation exposure accompanied with other forms of injury, such as puncture wound, burn, hemorrhage, blast, etc., which comprises more than 60% of injuries from a nuclear explosion and greatly increases the risk of morbidity and mortality compared to radiation injury (RI) alone. However, no U.S. FDA-approved drugs are available for RCI. Previous studies in mice have demonstrated that countermeasures (Neulasta®) for acute radiation syndrome showed no mitigating effect on RCI, implying that RI and RCI might elicit differential mechanisms leading to the detriments. In this study, we compared the animal lethality, health status, tissue damages induced by skin wounding (SW) alone and radiation injury combined with skin wounds (RCI) in a mouse model. B6D2F1/J female mice, 12-14 weeks old, were exposed to sham, SW, and RCI at 8.5, 9.0, or 9.5 Gy total body irradiation (TBI) with a dose rate of 0.4 Gy/min. We monitored animal mortality, body weight, and wound healing for 30 days after irradiation. On day 30 post-irradiation, blood, serum, femurs, sternums, jejunums were collected; blood cell counts, serum cytokine array, bone marrow (BM) colony formation assay, and histological examination were conducted. Our data show that 8.5 Gy is the sub-lethal dose for RCI, and the lethal doses in RCI were 9.0 Gy (LD57/30) and 9.5 Gy (LD60/30). RCI at 9.0 and 9. 5 Gy caused significant body weight loss and delayed wound healing, whereas 8.5 Gy RCI did not delay wound healing in comparison with SW alone. It suggests the deteriorative impact of lethal dose RCI in skin wounds. Furthermore, the blood cell counts and histological examination of sternum and jejunum showed that RCI decreased platelets and lymphocytes and caused BM hypocellularity and intestinal crypt damage after 8.5-9.5 Gy TBI. However, the neutrophils, monocytes and the ratio of neutrophils/lymphocytes were significantly increased after 9.5 Gy when compared to 8.5 Gy RCI. In addition, the serum cytokine array data showed that levels of G-CSF, IFNγ, IL-6, IL-17, TNFα, IP-10, KC, and RANTES were elevated in RCI animals 30 days after 9.5 Gy, while only serum RANTES was increased in RCI mice irradiated at 9.0 Gy, indicating that the RCI-induced proinflammatory factor activation is in a radiation dose-dependent fashion, which is consistent with the delayed wound healing in these animals. The sustained systemic inflammatory status is a critical feature in RCI mice at 9.0 Gy/9.5 Gy. Taken together, our data are implicative that acceleration of wound healing and anti-inflammatory drug treatment are possible targets for the development of effective countermeasures against RCI. (This study is supported by NIAID-AFRRI IAA Work Plan A; the views expressed do not represent NIH, AFRRI, USUHS, Department of Navy, or US DoD. The authors declare no conflict of interests.)

Operations Track:

Placenta-Derived PLX-R18 Stromal Cells for Emergency Treatment and Prevention of H-ARS

Racheli Ofir, PhD
Pluristem

PLacenta eXpanded (PLX)-R18 is a 3D-expanded placenta-derived stromal cell product designated for the treatment of hematological disorders. The efficacy of the cells to reduce mortality and induce blood lineages in H-ARS was demonstrated in both murine and NHP. The cells demonstrated an efficacious effect on survival as well as on BM and blood cellularity both as mitigators given up to 72 hours post radiation and as a prophylactic treatment provided up to 24 hours before exposure to radiation. PLX-R18 treatment significantly increased the number of colony forming hematopoietic progenitors in the femoral BM and significantly raised peripheral blood cellularity. The MoA of PLX-R18 involves secretion of hematopoietic proteins that stimulate BM proliferation, differentiation, and migration. Previous mice studies showed that PLX-R18 cells responded to radiation-induced signals by transiently secreting hematopoiesis related proteins to enhance reconstitution of the hematopoietic system. PLX-R18 cell therapy was granted an orphan drug designation by the FDA for the treatment of H-ARS.. In addition, the FDA previously cleared Pluristem's IND application for PLX-R18 in the treatment of ARS. The IND allows Pluristem to treat victims who may have been exposed to high dose radiation due to a nuclear attack or accident.

A Phase I study to evaluate the safety and exploratory efficacy of intramuscular injections of PLX-R18 in subjects with incomplete hematopoietic recovery following HCT demonstrated a favorable safety profile and an increase in all three blood cell lineages compared to baseline (platelets $p<0.001$, hemoglobin $p=0.01$ and neutrophils $p=0.15$) and a decrease in the number of transfused units from a mean monthly number of 5.09 for platelets and 2.91 for red blood cells at baseline to 0.55 for platelets ($p=0.045$) and 0 for red blood cells ($p=0.0005$) at 12 months. Furthermore, the observed annual mortality rate following PLX-R18 administration was 18% compared to 29% in a cohort of allogeneic HCT recipients with incomplete hematopoietic recovery, obtained from the Center for International Blood and Marrow Transplant Research (CIBMTR) registry, representing a similar patient population.1

The recent COVID-19 global pandemic highlighted the logistic challenges in rapid response in emergency events such as may also occur in a nuclear event and the need for well-established cold chain platforms became crucial. Pluristem gained vast knowledge in cryo cold-chain development during its multinational studies in both acute and chronic indications. Experience has been gained in working with existing cGMP compliant Cryostorage hubs along ability to rapidly build, validate and train new hubs in hospitals. Out of the box solutions such as transferrable storage containers that do not require electricity supply nor nitrogen fill for up to 30 days allowed us to act fast as the pandemic rapidly expended. Furthermore, advances were made in product cryo-stability and development of robust solutions to monitor and control the product quality under extreme storage conditions. The fully developed supply chain and 365/24/7 readiness has enabled us to supply PLX to critical care Covid patients around the US (east and west coast) within less than 24 hours. These solutions can be utilized to enable rapid and effective deployment of PLX-R18 in a nuclear event.

US Department of Health & Human Services Biomedical Advanced Research and Development Authority's Radiological/Nuclear Medical Countermeasures Program

Shannon Loelius, PhD
HHS/ASPR/BARDA

The United States Department of Health and Human Services (HHS) is fully committed to the development of medical countermeasures (MCM) to address national security threats from chemical, biological, radiological, and nuclear (CBRN) agents. The Biomedical Advanced Research & Development Authority (BARDA), a component of the HHS Office of the Assistant Secretary for Preparedness and Response (ASPR), is tasked with the advanced development and procurement of medical countermeasures for influenza, emerging infectious diseases and CBRN threats, including radiation injury. In this presentation, we will describe BARDA's radiological and nuclear MCM product portfolio and strategy, as well as the coordinated efforts between BARDA and partner agencies in the US Government. Establishment of product development tools, strategies for biomarker and target identification, and strategies for reducing product development costs will be briefly discussed in the context of BARDA portfolio management.

Identification of Novel Biomarkers for Acute Radiation Injury Using Multi-Omics Approach and Nonhuman Primate Model

Vijay Singh, PhD
USUHS/AFRRI

The availability of validated biomarkers to assess radiation exposure and to assist in developing medical countermeasures remains an unmet need. We used a cobalt-60 gamma-irradiated nonhuman primate (NHP) model to delineate a multi-omics-based serum probability index of radiation exposure. Both male and female NHPs were irradiated with different doses ranging from 6.0 to 8.5 Gy, with 0.5 Gy increments between doses. We leveraged high resolution mass spectrometry for analysis of metabolites, lipids, and proteins at 1, 2, and 6 days post-irradiation in NHP serum.

A logistic regression model was implemented to develop a 4-analyte panel to stratify irradiated NHPs from unirradiated with high accuracy that was agnostic for all doses of gamma-rays tested in the study, up to six days after exposure. This panel was comprised of Serpin Family A9, acetylcarnitine, PC (16:0/22:6), and suberylglycine, which showed 2 – 4-fold elevation in serum abundance upon irradiation in NHPs, and can potentially be translated as a molecular diagnostic for human use following larger validation studies.

Taken together, this study, for the first time, demonstrates the utility of a combinatorial molecular characterization approach using an NHP model for developing minimally invasive assays from small volumes of blood that can be effectively used for radiation exposure assessments. In conclusion, the results of this study validate the use of metabolomics/lipidomics and proteomic signatures as biomarkers to evaluate the extent of radiation injury which may be used to assess the efficacy of potential radiation countermeasures.

CRC SimPLER Modeling Scenarios of Critical Resources During Radiation Emergencies

Lauren Finklea, MS/BS Nuclear and Radiological Engineering
CDC

During a radiation emergency, the need for population monitoring resources will apply to many jurisdictions and resources will be limited. Understanding current capacity and predicting future need has been highlighted in recent national level exercises. The Centers for Disease Control and Prevention has developed CRC SimPLER, a throughput estimation and optimization tool that incorporates timing data collected at exercises across the country. This tool allows emergency managers, public health professionals and other radiation response and preparedness planners to evaluate their current plans for different scenarios. This presentation will highlight key findings from modelling data on throughput estimation for several radiation emergency scenarios and impacts of additional stations such as pet monitoring and decontamination or vehicle monitoring. We will discuss different methods of screening and registering individuals and their influence on overall throughput times. In each scenario presented, audience will be able to takeaway key resources needed to improve throughput capacity. Emergency managers can use CRC SimPLER to assess their population monitoring capabilities and decide where additional resources may be needed to meet their preparedness and response goals.

Use of National Poison Data System (NPDS) and Collaboration with Poison Control Centers

Art Chang, MD, MS
CDC

CDC has partnered with poison centers to leverage the National Poison Data System, a near real-time surveillance system to track exposures of public health significance. We will describe the use of NPDS during the Japan Fukushima nuclear reactor accident and describe potential poison center activities in future incidents.

The Path to ASPR's Regional Preparedness Model – Regional Disaster Health Response System (RDHRS)

Brittney Seiler, MPA
ASPR

The Regional Disaster Health Response System (RDHRS) establishes a model drawing on existing U.S. healthcare infrastructure, improving medical surge and specialty capabilities that during a national emergency can save more lives. This presentation will provide an overview of the RDHRS program, goals, existing demonstration sites, and potential opportunities.

Changing the Command Center: How Lessons Learned Helped Shape a New Philosophy of Incident Management

Mark VanDyke, M.Ed
Spectrum Health

While still amid the COVID-19 pandemic, a retrospective review of the incident response by one midwestern healthcare system provides for some lessons learned and key modifications to strengthen the response. A strong modified incident command structure provided the framework for the response. The modifications were designed from successes during a systemwide electronic medical record (EMR) implementation and included workgroups specific to a subject or discipline. These workgroups reported up through the traditional hospital incident command structure allowing for situational awareness at all levels. A solid meeting cadence ensured proper visibility into the work being completed while a data analyst group provided the much-needed data to make good decisions. Communication was one of the biggest successes as well as one of the lessons learned. Ensuring cross pollination in the work groups assisted with communication throughout and establishing a regular cadence of all staff emails and executive virtual updates allowed frequent communication and information sharing to all 42,000 employees.

A Field Hospital in The East Meadow!?! Lessons Learned from the 2020 New York City Central Park COVID-19 Field Hospital Experience

Al Villacara, DMD
Mount Sinai Health System

In early 2020, New York City became the epicenter for the initial COVID-19 wave. Hospitals faced a myriad of challenges, including shortages of personal protective equipment (PPE), management of an overwhelming number of decedents, and lack of bed availability across the five boroughs of the City. As case numbers began to skyrocket, New York State issued a requirement for all hospitals to increase their bed counts by 50%. Although the Mount Sinai Health System (MSHS) worked to maximize bed counts across their existing network locations, they still required a large number of additional beds to continue providing compassionate patient care and to meet the State directive. Leadership reviewed internal and external solutions and found a unique opportunity to establish a field hospital that would quickly and effectively provide the necessary bed surge capacity. MSHS ultimately collaborated with Samaritan's Purse (an international humanitarian aid organization based in North Carolina) to develop and implement the field hospital concept in the City.

This session will review the expedited field hospital creation process during the height of the COVID-19 pandemic's first wave. Session participants will learn of the rapid progression from initial conversations to prospective site visits, finalization of the Central Park East Meadow location, City approvals required to proceed, infrastructure setup, and the ultimate operationalization over the course of just five days. The multiple equipment/supply procurement requirements, planning/logistical hurdles, and the existing and new partnerships MSHS leveraged to help overcome these obstacles will all be explored in detail. The operational and clinical strategies that outlined how the field hospital integrated with the nearby Mount Sinai Hospital and MSHS facilities across the City will also be shared. Furthermore, the session will investigate the potential application of the field hospital concept to augment a health system's response to a future New York City radiological/nuclear incident scenario.

The Mount Sinai Health System learned a great deal from this unique field hospital experience and is excited to share our lessons learned with the RITN community.

Radiological MCI: Black Swan or Gray Rhino? Preparing for Communicating the Unthinkable

Rosemary McDonnell, MPS, DPS (ABD)
Northwell Health

This presentation will provide healthcare facilities with an overview of the challenges related to recognizing, prioritizing, and preparing for the threat of a mass casualty event causing radiological injuries. The concepts of classifying this type of event as a black swan (highly improbable catastrophe with extreme impact that we are unable to predict) or gray rhino (highly probable catastrophe with extreme impact that we are able to predict) will be explored in order to expose some of the barriers to emergency planning for these events that healthcare facilities may face, as well as ways to overcome them and elicit support. Suggestions for operational initiatives and crisis communications related to an emergency response for radiological MCI's will be given, with a special focus placed on communicating effectively with the most vulnerable populations a healthcare facility may encounter.

Effective Information Sharing Through Collaboration

Jay Johnson, Ed.D, CEM, MEP
Mayo Clinic

Healthcare systems in the US found themselves having to communicate rapidly developing and changing guidance with unprecedented speed to the communities they serve during the COVID Pandemic. The need to communicate was complicated by the complexity of the scenario, the impact of additional information on plans of action, the inconsistency of direction and policy from governmental entities, and the politicization of real and perceived response actions.

Communication with the communities you serve is by no means simple, and we watched many governmental bodies and entire communities' model ineffectual behaviors. We also watched some communities achieve optimal results by committing to simplicity, consistency, and coordination.

We will cover the processes leveraged by one community that were highly successful. As a group consisting of several jurisdictional government entities, non-government healthcare providers, and non-government not for profit healthcare systems we learned that our prior engagement, planning, training, and exercising provided the foundation upon which we were able to build an effective COVID Communication Process and drive toward a level of service and success exceeding that experienced by our geographically dispersed peers.

The use of a Joint Information System served as both the vehicle for information distribution, but also as the means by which we were able to reduce inconsistency of messaging and mis-alignment of processes among the participants.

General Sessions:

Radiological/Nuclear Incident Preparedness: Lessons Learned from the COVID-19 Pandemic

David Cassatt, PhD
NIAID

The COVID-19 pandemic has been characterized by a mobilization of governments and the scientific community to manage health care and develop treatments and vaccines. This talk will focus on how these lessons can be applied to the development of medical countermeasures to prepare for a large-scale radiological or nuclear event.

Leveraging the Regional Disaster Health Response System Telehealth Capabilities During a Marrow Toxic Injury Mass Casualty Incident

Jack Leeber, MSEM & Eileen Searle, PhD, RN, CCRN
Massachusetts General Hospital

Providing fast and scalable access to specialty expertise has the potential to save lives in a large-scale disaster. The Regional Disaster Health Response System programs are building capacity and capabilities, including disaster telehealth services to meet 21st century health threats.

Using Lessons from COVID-19 to Advance Radiological/Nuclear Incident Response and Recovery Guidance, Tools, and Knowledge

Orly Amir, MUP
DHS

COVID-19 offers lessons for the radiological/nuclear response community to consider for improving incident management and characterization and minimizing impacts to communities. This presentation will compare the two scenarios and discuss research underway at the Department of Homeland Security's Science and Technology Directorate to support first responders based on lessons from the pandemic response.

Closing Keynote:

Ukraine Under 2022 Russian Invasion: How Ready for a Nuclear Catastrophe is a Country That Has Previously Experienced a Large-Scale Radiation Accident

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Ukraine under 2022 Russian invasion: how ready for a nuclear catastrophe is a country that has previously experienced a large-scale radiation accident.

Soon after Russia invaded Ukraine in 2022, the risks of nuclear catastrophe like a-bombing or NPP accident became obvious. We will discuss how experience in studying the consequences and treating the victims of previous radiation accident at Chernobyl NPP helped Ukraine to get prepared for a possible another nuclear disaster.

RADIATION INJURY TREATMENT NETWORK

RITN WORKSHOP | BIOS – SPEAKERS, SESSION CHAIRS, & PLANNING COMMITTEE

Michael Abend

I earned several professions such as a medical doctor degree at the University Cologne, a professorship in Radiobiology at the Technical University Munich and studied Epidemiology (Master's degree) at the Gutenberg University in Mainz, Germany. I worked at different international scientific Institutions such as the Armed Forces Radiobiology Research Institute, Bethesda MD, or the National Cancer Institute (Radiation Epidemiology Branch), Rockville, USA. This background in medicine, molecular biology, radiobiology and epidemiology allowed my group to run e.g. one of the first molecular radioepidemiology studies where we merged whole genome gene expression examinations with epidemiology on radiation exposed cohorts, such as the Chernobyl Ukrainian-American cohort or the Mayak cohort. Molecular diagnostic of acute health effects after radiation exposure represents another focus of my group. Our work became recognized, and we did win several scientific awards and published over 100 peer reviewed scientific papers. I hold offices at NATO groups and I´m currently in the position of a Deputy Director and leader of the Genomic department of the Bundeswehr Institute of Radiobiology. I do have over 20 years teaching experience at the bachelor, masters and postgraduate levels.

Jen Aldrich

Jen Aldrich is the Radiation Injury Treatment Network (RITN) Program Manager for the National Marrow Donor Program (NMDP)/Be The Match marrow registry. She is responsible for the day-to-day management of the RITN centers' annual task database for 74 transplant hospitals. Annual tasks include testing preparedness equipment, conducting exercises, and attending educational programs. Ms. Aldrich coordinates specialized training for RITN staff including working with external partners, both federal and private. Other responsibilities include managing a variety of project with partners such as the Advanced HAZMAT Life Support (AHLS), Gryphon Scientific, the National Association of County and City Health Officials (NACCHO), the National Alliance for Radiation Readiness (NARR), and the Radiation Emergency Assistance Center/Training Site (REAC/TS). Ms. Aldrich participates as a member of the Emergency Preparedness Team during NMDP and RITN emergency preparedness incidents, exercises, and drills. She manages a wide range of communication systems to include the Healthcare Standard online bed reporting system (HCS) and Government Emergency Telecommunications Service (GETS) calling cards. Ms. Aldrich is currently a certified emergency manager in Minnesota and an Intelligence Liaison Officer for the state of Ohio. Ms. Aldrich completed her undergraduate degree in Psychology and Sociology at the University of Wisconsin – Eau Claire. In 2016, she obtained her Master of Arts in Intelligence Studies with a concentration in Terrorism from the American Military/Public University.

Orly Amir

Orly Amir is a Division Director at the National Urban Security Technology Laboratory (NUSTL), a government-owned and government-operated laboratory of the U.S. Department of Homeland Security's Science & Technology Directorate (DHS S&T). Orly manages NUSTL's Radiological/Nuclear Response and Recovery Research and Development portfolio, which has led to the development of new tools and knowledge product solutions that support federal, state, local, tribal, and territorial first responders, emergency managers, incident commanders and decision-makers during radiological or nuclear emergencies. Prior to joining S&T in 2014, Orly worked for the NY-NJ-CT-PA Regional Catastrophic Planning Team where she managed the development of an emergency management training program and evacuation and nuclear response planning tools. She also worked on Capitol Hill as a legislative staff member for a Member of Congress, focusing on energy, transportation, and environmental policy issues. Orly has a Bachelor of Arts in Political Science from Union College and a Master of Urban Planning from New York University's Robert F. Wagner Graduate School of Public Service.

Adayabalam Balajee

Dr. Balajee has been working in the field of Radiation Biology for more than 20 years with special emphasis on radiation biodosimetry and radiation induced biological effects in diverse human and animal cell model systems. After obtaining his Ph.D. degree in Molecular Cytogenetics in 1991 from Banaras Hindu University in India, Dr. Balajee got his post-doctoral training at the University of Leiden, The Netherlands. Dr. Balajee spent 5 years as a visiting scientist at the National Institute of Health in Baltimore where he focused his research on genomic instability, cancer, and aging. After his tenure at the NIH, Dr. Balajee worked as a Research Scientist/Principal Investigator at the Center for Radiological Research, Columbia University Medical Center, NY for more than 15 years prior to his joining as the Director of Cytogenetic Biodosimetry Laboratory at REAC/TS in Oak Ridge in 2015. Dr. Balajee's current research is focused on developing automated high throughput triage tools for radiological/nuclear mass casualty incidents. In addition, Dr. Balajee has been actively collaborating with a number of national and international institutions to develop novel and minimally invasive biomarkers for detecting radiation induced early and late health effects. Dr. Balajee reviews original research and review articles on diverse aspects of radiation biology and cancer for many well-known scientific journals and has edited special issues for journals such as Mutation Research and Cytogenetic and Genome Research. Dr. Balajee has given numerous invited lectures on radiation biology and biodosimetry at the national and international conferences and workshops.

Cullen Case Jr.

As the Program Director of the Radiation Injury Treatment Network Cullen coordinates the preparedness activities of a group of 74 hospitals preparing for a mass casualty radiological disaster. These efforts include coalition development, contract management, task completion, educational material development, exercise development and execution as well as special projects to improve related national preparedness for a radiological disaster. Additionally, he is the Senior Manager of Business Continuity for the National Marrow Donor Program/Be The Match marrow registry where he is responsible for ensuring timely delivery of all product worldwide during contingency situations, as well as organizational resiliency, crisis management and response, business continuity planning, information technology disaster recovery program and the exercising of all related plans.

David Cassatt

David Cassatt, PhD, is a Program Officer with the Radiation/Nuclear Countermeasures Program (RNCP) at NIAID. Dr. Cassatt's contract portfolio includes the Product Development Support contracts, which have been used to develop animal models of radiation injury and to test medical countermeasures, including the animal studies that led to FDA approval of three products (Neupogen®, Neulasta®, and Nplate®) to treat acute radiation syndrome.

Dr. Cassatt has been with the NIH for 17 years, having previously been an investigator at MedImmune, Inc., where he worked on the development of vaccines for HIV and Lyme disease and performed preclinical research for an expanded indication of the radioprotective drug Ethyol® (amifostine). He received his bachelor's degree in biological science from Cornell University, his doctorate in toxicology and immunology from the University of Kentucky and conducted post-doctoral research at SmithKline Beecham plc (now GSK plc).

Outside of the office, Dr. Cassatt enjoys hiking, gardening, home repair, music, singing, and hanging out with his five grandchildren.

Art Chang

Arthur S. Chang, MD MS, is the Chief Medical Officer of the Division of Environmental Health Science and Practice, National Center for Environmental Health, Centers for Disease Control and Prevention. He graduated from Drexel University School of Medicine and trained in Emergency Medicine at Hahnemann University Hospital and Medical Toxicology at Emory University. Prior to his career in public health, he was on the clinical faculty of Emory University Department of Emergency Medicine with the rank of assistant professor. Dr. Chang holds board certifications in Emergency Medicine and Medical Toxicology from the American Board of Emergency Medicine. He has contributed over 30 publications to the peer-reviewed scientific literature on the topics of acute poisonings, toxic exposures, chemical and radiological terrorism, emergency preparedness, environmental health investigations and public health surveillance. He practices emergency medicine at a suburban trauma center in metro Atlanta. He credits his multi-cultural heritage and language skills to being born in Taipei, Taiwan and growing up in Buenos Aires, Argentina and Philadelphia, Pennsylvania. He now calls Atlanta, Georgia home and enjoys hiking, mountain biking and other outdoor activities with his family.

Nelson Chao

Nelson Chao, MD, MBA
Professor of Medicine, Immunology and Pathology
Duke University

Dr. Chao is Professor of Medicine and Immunology and the Chief of the Division of Cellular Therapy/BMT and the Division of Hematologic Malignancies at Duke University. He received his undergraduate degree from Harvard University, MD from Yale University and did his post-graduate training at Stanford University. He then joined the faculty at Stanford University. He was the Associate Director of Stem Cell Transplantation at Stanford University prior to moving to Duke University in 1996 as the Program Director of the Bone Marrow Transplantation Program. The program became a Division within the Department of Medicine in 2000 and was renamed as the Division of Cellular Therapy/BMT. It became the Hematologic Malignancies and Cellular Therapy Division in 2012. He was also named the Director of Global Oncology in the Duke Global Health Institute in 2013. He is also the Co-Director of the Clinical Stem Cell Transplantation Laboratory and continues to direct his own research laboratory focused on hematopoiesis, understanding, and preventing graft-versus-host disease and improving immune reconstitution. He obtained his MBA from the Fuqua School of Business at Duke University in 2000. He is the author of over 300 peer-reviewed papers. He active nationally and internationally in the area of stem cell transplantation and in nuclear biodefense. He is also a co-founder of Aldagen, and C2 Regenerate, startup biotechnology companies in Research Triangle Park.

Andrea DiCarlo

Andrea DiCarlo earned her doctorate from the University of Maryland for work focused on targeting heat shock proteins to reduce oxidative stress caused by radiation and other stressors. These studies led her to carry out post-doctoral work at The Catholic University of America (CUA), where she studied radioprotection of normal tissues. In 2002, Andrea initiated collaborations with the Armed Forces Radiobiology Research Institute and the Lombardi Cancer Center and parlayed her postdoctoral work into a CUA faculty position. In 2004, Andrea became a Program Officer in the Radiation and Nuclear Countermeasures Program (RNCP) at the National Institute of Allergy and Infectious Diseases (NIAID), where she was responsible for the oversight and management of a research portfolio exceeding ~$20 million dollars per year. In 2019 she was promoted to the RNCP Director role. She has published extensively in government reports and peer-reviewed journals on the biological effects of radiation exposure, testing of medical countermeasures, and evaluation of biodosimetry devices and biomarkers for triage. Representing NIAID, she has worked with other government and non-governmental organizations to support national and international research activities, reviewed grant applications and manuscripts, and serves as a subject matter expert and invited presenter for numerous working groups and conferences. An associate editor for Radiation Research since 2015, she was named a Senior Editor in 2022.

John L. Esker

Dr. John Esker is an interdisciplinary scientist in the Radiological and Nuclear Countermeasures program at BARDA serving as a Project Officer and Subject Matter Expert for a number of Advanced Research and Development contracts. During the COVID-19 pandemic, he is also supporting the development of SARS-CoV-2 Diagnostic tests. His primary focus is establishing minipig, rabbit and NHP animal models, repurposing of approved drugs for other uses as medical countermeasures, and development of new medical countermeasures for Acute Radiation Syndrome. He joined the BARDA CBRN division in 2009 and came to the federal government after serving 15 years in the private sector and non-profit sector involved in drug development and associated pharmaceutical standards.

Previously at the United States Pharmacopeia (USP), Dr. Esker served as the Director of the Reference Standards Laboratory and in other roles involving the collaborative testing of USP Reference Standards. He also served as a Liaison for the development of the quality standards published in the USP/NF. At Abbott Laboratories, he was a chemist and team leader developing analytical methods and quality specifications for early to mid-Phase developmental drugs and their formulations. Dr. Esker gained his post-doc experience in medicinal chemistry at Wayne State University as a Merck fellow after receiving his PhD from Texas A&M University and BA from St. Mary's College of Maryland.

Valerie Eyerly

Valerie is an Administrative Specialist for the National Marrow Donor Program/Be The Match marrow registry. She is responsible for performing organizational, administrative, and coordination support for the Vice President of Infrastructure, Enterprise Architecture, and Information Security. She assists with the planning of various meetings, events, and training activities, as well as managing travel and expense report processing. Previously she supported the Executive Dean of Business, Arts, Sciences & Academic Initiatives at Chippewa Valley Technical College where she earned her Executive Assistant Associate degree. She lives in Saint Paul, Minnesota, and enjoys reading, writing, fostering animals, and hanging out with her cats and dog.

Lauren Finklea

Lauren Finklea is a nuclear engineer in the Radiation Studies Section at the Centers for Disease Control and Prevention. Ms. Finklea serves as a subject matter expert for emergency preparedness and response activities as well as computational modeling for radiation protection. She is the lead developer and creator of SimPLER. Prior to joining CDC, she worked at Oak Ridge National Laboratory performing Monte Carlo simulations for environmental contamination. She received her B.S. and M.S. degrees in Nuclear and Radiological Engineering from Georgia Institute of Technology in Atlanta, Georgia. Currently she is pursuing her Doctorate in Public Health.

Sanchita Ghosh

Sanchita Ghosh, PhD is the senior principal investigator at the Armed Forces Radiobiology Research Institute (AFRRI), Uniformed Services University of the Health Sciences. She has more than 30years of laboratory research experience in chemistry, biochemistry, cellular and molecular biology, and radiation biology. Dr. Ghosh began her research career at the Indian Association for the Cultivation of Science in India, where she received her PhD degree. Her post-doctoral research at NIDCD (NIH) was focused on G-protein coupled receptors. Dr. Ghosh joined AFRRI in 2005 and since then she has been involved in evaluation of several radiation countermeasures, few of them have advanced to nonhuman primates. Currently, she is involved in screening and developing medical countermeasures against radiation in rodent model under NIAID-AFRRI IAA and AFRRI Intramural screening program. She is the recipient of several extramural and intramural grants. Dr. Ghosh also serves as the Chair of the AFRRI Intramural Program Committee.

Jonathan Gill

Jonathan Gill is currently the Nuclear Incident Response Team and Nuclear Radiological Incident Response Task Force program manager in FEMA's CBRN office. Prior to this, Jon spent two and a half years at DOE/NNSA headquarters in the Office of Nuclear Incident Response as a fellow and lab detailee where he advised and assisted in the management of various interagency projects involving radiological consequence management. Before his time at DOE, Jon conducted research at the University of Tennessee on optically stimulated luminescence applications for nuclear forensics, manufacture of surrogate nuclear debris, and dissolution and fusion methods for mass spectral analysis of surrogate and actual nuclear debris. In Jon's previous life, he served eight years in the US Army as a Platoon Leader, Company Commander, Brigade Operations Chief, and Battalion Operations Officer. His military experience spanned leading units up to 100 Soldiers and contractors in combat operations, managing large ground operations and logistics activities in austere conditions of over 3500 personnel covering approximately 100,000 square miles, and project managing the construction of single-story buildings and roads.

Jonathan's educational background includes a BS in Nuclear Engineering from the United States Military Academy, a MS in Engineering Management from the University of Missouri Science and Technology, and a MS and PhD in Nuclear Engineering from the University of Tennessee. Jon lives happily in northern Virginia with his wife Kristin and two daughters.

Rahul Goyal

Rahul Goyal is a graduate student at the Center for Translational Medicine at University of Maryland School of Pharmacy. His current research is focused on utilizing machine learning methodologies to different applications in healthcare such as acute radiation syndrome, vancomycin associated acute kidney injury, and tuberculosis. Prior to joining the PhD program, he pursued his Master's in Business Analytics from the University of Texas at Dallas followed by industry experience as a Data Scientist and Data Engineer.

John Hagins

John is the President and CEO of Midwest Blood Centers, Inc. and The Community Blood Center in Appleton, WI. In his role, John is responsible for the overall leadership and direction of a healthcare not-for-profit that provides blood and blood products to more than 40 primary supply hospitals in Upper Midwest and serves as a secondary supplier throughout the US. John holds a Bachelor of Arts in Business Administration from Stockton University in Pomona NJ and has been in the blood banking field for 35 years. Prior to moving to Appleton, John worked for the American Red Cross Blood Services in Philadelphia, PA and Johnstown, PA.

John is the Immediate Past Chair of the Board of Directors of Blood Centers of America (BCA), a cooperative organization of more than 60 independent blood centers representing the largest blood supply network in the United States; is a member of the Public Policy Council for America's Blood Centers (ABC), a national trade organization; and served five years on the Board of Directors and was President of the Association of Donor Recruitment Professionals (ADRP). John also serves as the Chair of Board of Directors of Blood Centers' Exchange (BCx), a national risk retention group geared toward meeting the insurance needs of a highly complex and regulated blood banking industry. On January 1st, John became a member of the Board or Directors of the Association for the Advancement of Blood and Biotherapies (AABB) and is now the Chair of the AABB Interorganizational Task Force on Domestic Disasters and Acts of Terrorism.

Richard Harvey

Dr. Harvey received his undergraduate and master's degrees from the University of Buffalo and his doctorate from the University of Michigan. He is a Board-Certified Health and Medical Physicist. He is a Licensed Medical Physicist in New York and a certified Medical & Industrial Laser Safety Officer. Dr. Harvey is currently the Director of Radiation Safety, Radiation Safety Officer, and Laser Safety Officer at Roswell Park Comprehensive Cancer Center. He is an Assistant Professor at the University of Buffalo in the Departments of Nuclear Medicine, Physiology & Biophysics, and Pharmacy & Pharmaceutical Sciences. Dr. Harvey currently teaches in the undergraduate nuclear medicine technology and graduate medical physics program at the University of Buffalo, and the radiation therapy technologist program at Erie Community College. Dr. Harvey is an active member of the Health Physics Society, American Association of Physicists in Medicine and serves as a member of the ANSI Z136.3 committee for the Safe Use of Lasers in Healthcare. He has also been appointed as the Radiation Safety Officer Representative on the Nuclear Regulatory Commission's Advisory Committee on the Medical Use of Isotopes.

Gregory Holmes-Hampton

Dr. Holmes-Hampton received his PhD in Chemistry from Texas A&M University and completed a post-doctoral fellowship at the National Institutes of Health in the National Institute of Child Health and Human Development. Following this Dr. Holmes-Hampton began working at the Armed Forces Radiobiology Research Institute with a focus on radiation countermeasure development.

Mary Homer

Mary J. Homer, Ph.D. is Chief for Radiological and Nuclear Countermeasures in the Division of Chemical, Biological, Radiological and Nuclear Countermeasures at BARDA. Mary joined BARDA in 2008 and in her position, she facilitates efforts in the development and acquisition of therapeutics targeting radiological and nuclear threat agents. She is responsible for the development, implementation, and oversight of programs funded by the Project BioShield Act of 2004. Currently, her portfolio includes ~20 products and other developmental activities and is funded at $335M for FY2022 including both advanced research and development (AR&D) funding and Project Bioshield (PBS) procurements. She was the lead for the COVID Convalescent Plasma program at BARDA as part of the HHS response to the COVID pandemic.

Naduparambil K. Jacob

Naduparambil K. Jacob, PhD is a tenured Associate Professor in the Department of Radiation Oncology at the Ohio State University (OSU) College of Medicine, Columbus Ohio. He leads a research program focusing on biodosimetry and the development and testing of countermeasures for the mitigation of radiation injury. He participated in international programs in these areas for the last 10 years and presented research data in ASTRO, RITN, IAEA, MHSRS, ConRad and RRS. Dr. Jacob is co-holder of US Patents 9890428, 10407726, 10131952 and 10513736, licensed to Capture Collective Inc. Dr. Jacob is co-founder and consultant to Capture Collective Inc.

Ann Jakubowski

RITN National Medical Advisor
Attending Physician, Hematologic-Oncology Division
Memorial Sloan Kettering Cancer Center,
Clinical Director, Adult Bone Marrow Transplantation Outpatient Unit
Professor of Medicine
Weill Cornell Medical College, Cornell University

James Jeng

Currently a staff burn/trauma/critical care surgeon at the University of California Irvine.
Health Sciences Professor of Surgery
US Navy Reserve veteran
Three decades burn care experience
Prior chair of ISBI Disaster Committee
Current co-chair of ABA Ad Hoc Disaster Committee
Member of ACS-Committee on Trauma (National)
Has worked on burn mass casualty preparedness for the past 10 years
Education:
BA Johns Hopkins University ’82
MD Columbia University College of Physicians & Surgeons ’86
Surgical Residency Geo. Washington University ’86-’92
Fellowship in Trauma/Critical Care Washington Hospital Center ’92-’93

Jay Johnson

Jay M. Johnson, Ed.D, MEP, CEM®, CRMP®, CHPCP® is Manager of Emergency Management and Business Continuity at Mayo Clinic in Rochester MN, and an Assistant Professor of Health Care Administration at Mayo Clinic College of Medicine and Science. He has many years of experience in Fire-Rescue and Emergency Medical Services (EMS), Health Care Emergency Management, and is extensively involved in multi-agency coordination through leadership roles in Regional Healthcare Preparedness Coalition implementation. Jay brings a collaborative community-based perspective to preparedness and continuity efforts. He has Bachelor of Science in Public Safety Administration, Master of Science in Leadership with a concentration in Crisis Management and Emergency Preparedness, and a Doctorate in Education with an emphasis in Healthcare Administration from Grand Canyon University in Phoenix, AZ.

Liz Johnson

Liz is a Sr. EPMO Analyst for the National Marrow Donor Program/Be The Match.
She partners with project managers and finance on project financials, collaborates with vendors and contract managers to ensure management of most IT contractors, creates reporting for the EPMO, and creates and oversees the department SharePoint site. She has been working with RITN since 2019 assisting with executive committee meetings and other various meetings. She is also a leader in the Women's Employee Resource Group and the Employee Chair of the Board of Ambassadors at BTM.
She lives in Crystal, Minnesota with her husband, dogs, and cats.

Ziad Kazzi

Dr. Kazzi trained in Emergency Medicine at Emory University in Atlanta (2000-03) before completing a subspecialty fellowship in Medical Toxicology at Emory University, Georgia Poison Center and the Centers for Disease Control and Prevention (CDC) in Atlanta. He is board certified in both Emergency Medicine and Medical Toxicology. Currently, he is a professor at the department of Emergency Medicine at Emory University in Atlanta, Georgia as well as the director of the International Toxicology Fellowship Program at Emory University. He is also the assistant medical director of the Georgia Poison Center, associate medical director of the Southern Regional Disaster Response System and a guest researcher at the National Center for Environmental Health at the CDC where he participates in emergency preparedness and response activities in radiation.
As an emergency physician and toxicologist, Dr. Kazzi specializes in the recognition, triage, and management of poisonings and holds a deep interest in the areas of Radiation and International Toxicology. He founded and chaired the American Academy of Clinical Toxicology Radiation Interest Group since 2009. He is currently serving as a secretary treasurer of the American College of Medical Toxicology (ACMT). He chairs the ACMT International Committees. Dr. Kazzi has extensively lectured at National and International conferences and developed several curricula and training programs in emergency preparedness and response. Dr. Kazzi is a member of the National Council on Radiation Protection and Measurements and serves on the executive committee of the Radiation Injury Treatment Network.

Prof. Sergiy Klymenko

Prof. Sergiy Klymenko is Head of the Center of Hematology, Hemoblastosis Chemotherapy and Bone Marrow Transplantation at "Feofaniya" Clinical Hospital of State Management of Affairs and Head of the Chair of Clinical Laboratory Diagnostics of Shupyk National Healthcare University of Ukraine in Kyiv, Ukraine. He serves as Main Hematologist and Expert Hematologist of Ministry of Health of Ukraine since 2014. He received his M.D. from the Kyiv Medical University, Ukraine (1991) and is certified in Hematology (1993) and Genetics (2015). He obtained his M.Sc. in Radiation Biology (2003), with distinction, from University College London, UK, and holds Ph.D. (2000) and Sc.D. (2006) in Hematology from Institute of Hematology and Blood Transfusion, Kyiv, Ukraine. Before current appointments, he held several positions in Clinic and Institutes of National Research Center for Radiation Medicine of National Academy of Medical Sciences of Ukraine, and position of Postdoctoral Researcher in Institute of Pathology, GSF, Neuherberg, Germany. His main research interests are myeloid malignancies and molecular genetics of radiation-induced tumors. He was a Member of National Radiation Protection Board of Supreme Council of Ukraine since 2010 through 2019. He is Deputy Chairman of the Commission of Ministry of Health and National Academy of Medical Sciences of Ukraine in Hematology and Transfusiology. He acted as leader in numerous scientific projects in the field of radiobiology, genetics, and hematology. He is author of more than 250 scientific publications in books, international and national scientific journals.

Richard Kowalski

Richard Kowalski, Ph.D. is the Chief Scientist and Principal Investigator at ASELL. Dr. Kowalski has over 30 years of experience developing and supporting in vitro diagnostic devices including confirmatory assays for HIV, HTLV-I/II, and Lyme disease along with IDE experience using mesenchymal stem cells for bone repair, cancer treatment, and gene therapy and platelet-rich plasma support for wound care. Prior to joining ASELL, Dr. Kowalski led Medical and Clinical Affairs teams and early Product Development at Cylex Inc. As lead of Product Development at Cylex, Dr. Kowalski brought the Cylex Immune Cell Function Assay (ImmuKnowÂ®) from bench to bedside by leading the clinical and analytical validation studies to support clearance of ImmuKnow for marketing in the US. Dr. Kowalski provides ASELL the experience required to validate the safety and efficacy of high-complexity assays and detection systems. Dr. Kowalski received his doctorate in Molecular Biology at Vanderbilt University.

Vidya Kumar

Dr. Kumar is a Staff Scientist at Armed Forces Radiobiology Research Institute with the Henry M Jackson Foundation and Adjunct Assistant Professor at Department of Biochemistry, USUHS Bethesda, MD. She has a PhD in mechanistic enzymology from Department of Chemistry and Biochemistry, University of Oklahoma, OK and postdoctoral training in protein crystallography at Yale school of medicine, CT. She brings several years of pharmaceutical industry experience in preclinical drug discovery from her prior employment at AstraZeneca. Her current interest is in preclinical countermeasure development for multi-organ radiation injury with special focus on gastrointestinal and lung injury.

James (Jack) Leeber

Jack Leeber is a Project Manager for the Region 1 Regional Disaster Health Response System within the Center for Disaster Medicine. Most recently, Jack received a Master of Science in Emergency Management degree from Massachusetts Maritime Academy. He previously earned a Bachelor of Science in Public Health degree with a focus in program planning and implementation from the University of Massachusetts at Lowell. Jack’s primary focus is the development of a regional no-notice disaster telehealth system as well as the promotion of stakeholder engagement. Prior to joining the Center for Disaster Medicine, Jack has held several positions in healthcare including clinical patient care roles and supporting work in environmental health and safety/emergency preparedness.

Shannon Loelius

Shannon Loelius earned her PhD in Immunology from the University of Rochester Medical Center in 2019 for her work evaluating the effects of stressors on platelet function. She joined the Radiological and Nuclear (R/N) Countermeasure Branch at BARDA in 2019 as an ORISE fellow, where she supported nonclinical model development and program management. In 2020, Shannon transitioned to a federal position at BARDA and works as a project officer in the R/N branch.

Rosemary McDonnell

Rosemary McDonnell serves as the Senior Emergency Management Specialist at Northwell Health System's North Shore University Hospital, developing and maintaining emergency preparedness and response capabilities for the entire hospital population. She is also an Adjunct Professor in the St. John's University College of Professional Studies Division of English and Speech, as well as in the Division of Criminal Justice, Legal Studies, and Homeland Security, teaching various emergency management and homeland security courses. She is currently enrolled in the Homeland Security Doctorate of Professional Studies program at St. John's University, in the inaugural cohort of the program. Her research interests focus on vulnerable and at-risk populations in the scope of their access to appropriate emergency preparedness and response resources and planning.

Randy Mieskoski

Randy "Ski" Mieskoski is the Consequence Management Program Manager for the National Nuclear Security Administration's (NNSA) Office of Nuclear Incident Response. Mr. Mieskoski provides Federal level program management and leadership to NNSA's Radiation Emergency Assistance Center/Training Site, Aerial Measuring System, National Atmospheric Release Advisor Center, and Consequence Management Response Team and Home Teams.

LT Garrett Morgan

LT Garrett Morgan is an active-duty Medical Service Corps Research Physiologist in the US Navy, with fifteen years of professional experience in health-related science. He currently works as a Program Officer with the Office of Naval Research where he manages a research portfolio that is valued at $112M and supports nearly 70 ongoing research projects covering a wide range of DOD-relevant health-related topics. Prior to this role, he served as a Deputy Dept Head for the Scientific Research Department within the Armed Forces Radiobiology Research Institute. Over the course of his career, LT Morgan has conducted studies that have addressed a spectrum of basic health and disease and applied physiology questions in the fields of cardiovascular disease, neuroscience, and cancer, and has now managed science in the fields of radiobiology and biomedical RDT&E. These efforts have involved a broad array of study designs, non-clinical models, clinical populations, and research techniques and methodologies. His research efforts have also been supported by consistent research funding from training grants as a graduate student and postdoctoral fellow to independent project-level funding as a principal investigator. Further, these projects have led to numerous publications of research results in various peer-reviewed journals and technical reports; frequent presentations of results at scientific conferences; and several awards, including the 2017 US Department of the Navy, Physiologist of the Year. LT Morgan is also a regularly requested peer-reviewer of original research articles submitted to various scientific journals, including Circulation Research.

Maria Moroni

Dr Maria Moroni is a Project Officer and Biodosimetry Project Lead in BARDA's Detection, Diagnostic and Device Infrastructure Division. Prior to joining BARDA in 2019, she was a Principal Investigator at the Armed Forces Radiobiology Research Institute where her focus has been on nuclear preparedness efforts through the evaluation of medical countermeasures (MCM) and animal model development. She pioneered the development of minipig models of hematopoietic, gastrointestinal, and cutaneous Acute Radiation Syndrome (ARS) and used such models to test MCM against the ARS and to assess biodosimetry applications. Her research on the pathophysiology of the ARS, MCM efficacy, mechanisms of radiation sensitivity, and biodosimetry applications is published in several peer-reviewed journals and book chapters.

Racheli Ofir

Holds PhD and Post Doc from The Technion – Israel Institute of Technology, Faculty of Medicine, Haifa. Have 25 years' experience in molecular cell biology. I currently serve as Vice President of Research in Pluristem, developer of Placenta derived cellular therapy for Acute Radiation Syndrome as well as other life-threatening indications. My Research team of 11 team members (5 PhDs) investigates the biological activity and mechanism of action of the various cellular therapies we develop using in-vitro, animal, and human studies. I am responsible for the collaborations with the NIAID and AFFRI for the development of placenta derived cellular therapy for the treatment of ARS. I am the author of numerous peer reviewed articles and have presented the PLX in numerous meetings.

Andrew Phipps

Andrew Phipps is a subject matter expert (contractor) at Tunnell Government Services supporting the mission of the Division of CBRN Countermeasures at the Biomedical Advanced Research and Development Authority (BARDA), Office of the Assistant Secretary of Preparedness and Response (ASPR), U.S. Department of Health and Human Services (HHS). He received his DVM and PhD in pathobiology at The Ohio State University. He has conducted advanced research and development of medical countermeasures (MCMs) for viral and bacterial diseases, biothreats, toxins, and radiological/nuclear threats. Over his research career he has contributed to the clinical and nonclinical development of many FDA-approved MCMs including brincidofovir (TEMBEXA), plazomicin (ZEMDRI), anthrax vaccine adsorbed (AVA/BIOTHRAX), and ACAM2000. He has co-authored more than 25 peer-reviewed articles on many viral and bacterial diseases, antibiotics, antivirals, and vaccines.

Adela Salame-Alfie

Dr. Salame-Alfie is a Senior Service Fellow in the Radiation Studies Section in the Center for Environmental Health at CDC. She previously held several positions at the New York State Department of Health. She is a council member of the National Council on Radiation Protection and Measurements (NCRP), a Lifetime member of the Conference of Radiation Control Program Directors (CRCPD) and served as Chair and member of the Board of Directors, chaired several committees, and received the 2014 Gerald S. Parker Award. She is a Fellow member of the Health Physics Society.

Dr. Salame-Alfie has extensive experience in radiological emergency preparedness and has published and co-authored many publications on the subject.

Dr. Salame-Alfie obtained her MSc and PhD in Nuclear Engineering from Rensselaer Polytechnic Institute in Troy, NY. She obtained her Bachelor's in Energy Engineering from Universidad Autónoma Metropolitana in Mexico City.

Eileen Searle

Dr. Eileen F. Searle joined the R1 RDHRS team in September of 2021 and now serves as the Executive Director of the Region 1 Regional Disaster Health Response System. Eileen brings with her an extensive background of clinical disaster preparedness and response to the RDHRS program. She has served as Massachusetts General Hospital's (MGH) Biothreats Program Director, overseeing development and implementation of MGH's hospital-wide special pathogens program and the operations of the Region 1 Emerging Special Pathogens Treatment Center (RESPTC). Eileen is a registered nurse with extensive experience caring for critically ill adult patients in acute care and community settings and is a Supervisory Clinical Nurse for the MA-1 Disaster Assistance Team (DMAT). Eileen has responded to multiple previous disasters with the MA-1 DMAT team. She received her BS, MS, and PhD in Nursing from Boston College and a Master of Public Health from Boston University.

Brittney Seiler

Brittney Seiler is a Senior Advisor within the National Healthcare Preparedness Programs (NHPP) branch at the US Department of Health and Human Services (HHS) Assistant Secretary for Preparedness and Response (ASPR). Within NHPP, Brittney leads the daily management of the Regional Disaster Health Response System demonstration sites. Brittney also serves as a co-lead for Data & Products, a team within the COVID-19 response leading hospital reporting. She has served a variety of roles across ASPR supporting senior leadership, public-private partnerships, and situational awareness. Brittney entered the government as a Presidential Management Fellow (PMF). She has a Master's of Public Administration from George Washington University, and a bachelor's degree in psychology from the University of Maryland.

Sam Shartar

Sam Shartar is responsible for directing the operations for the office. He also directs Emory's Threat Assessment Team and serves as the Emergency Management and Events Lead for Emory's Department of Emergency Medicine, Section for Prehospital and Disaster Medicine. Prior to joining CEPAR, Shartar served as the unit director for Emergency Services at Emory University Hospital. A Nationally Registered Paramedic (NRP) and former EMS supervisor, he has an extensive background in prehospital care and EMS operations. He serves as the agency director for Emory EMS (EEMS), has broad experience in emergency and critical care nursing, holds board certification as an emergency nurse (CEN), and is a fellow in the American Academy of Nursing (FAAN). His background in disaster management includes experience in EMS operations, biosafety transportation, special event management, incident management, crisis response and consequence management, field operations, exercise design and implementation, and health care operations. Shartar serves on Georgia's (GEMA) Type 3 All-Hazard Incident Management Team with FEMA qualifications as an incident commander, operations section chief, and safety officer. He serves on the Regional Emergency Medical Services Advisory Council for Region 3, representing DeKalb County. He works with the National Emerging Special Pathogen Training and Education Center (NETEC) and serves on the Executive Committee of the Radiation Injury Treatment Network (RITN). He also serves as a subject matter expert with the with the Southern Regional Disaster Response System (SRDRS). He is certified as a Professional Emergency Manager (PCEM), holds certification as an Emergency Management Healthcare Professional (EMHP), and is board certified as a National Healthcare Disaster Professional (NHDP-BC). Shartar practices clinically in the Emergency Department of Emory University Hospital.

Vijay Singh

Dr. Vijay K. Singh is a tenured Professor at Uniformed Services University of Health Sciences (USUHS), and a Principal Investigator at Armed Forces Radiobiology Research Institute (AFRRI), Bethesda, Maryland, USA. He is a well-recognized scientist in the area of Radiation Countermeasure development. His research interests have focused on the development of radiation countermeasures for acute radiation syndrome (ARS) and delayed effects of acute radiation exposure (DEARE), understanding the mechanism of radiation injury, and identification of biomarkers for radiation injury and countermeasure efficacy. He has made significant contributions for developing several promising radiation countermeasures for ARS. He has published 185 peer reviewed research articles in high impact journals, 18 book chapters, and 260 abstracts. He is well-funded by various funding agencies of US Department of Defense (CDMRP, DTRA, JPC7, DMRDP) and Department of Health and Human Services (BARDA/NIAID). He is a subject matter expert for several national and international professional committees. He reviews grant application for various national and international funding agencies, and manuscripts for large number of reputed journals. He is member of several professional societies and recipient of large number of awards. He is also editorial board member for several journals. After completing his Ph.D. from Central Drug Research Institute, Lucknow, India, Dr. Singh received his formal post-doctoral training at USUHS, NEI, and NCI, NIH. Previous to his current position, he served Sanjay Gandhi Post-Graduate Institute of Medical Sciences, Lucknow as an Additional Professor till 2001. Since 2001, Prof. Singh is at USUHS and AFRRI.

Stephen Spellman

Stephen Spellman, MBS, serves as Vice President, Research and Senior Scientific Director in the CIBMTR-NMDP with oversight for the Immunobiology Research Program and the Graft versus Host Disease and Graft Sources Working Committees. He is also the Principal Investigator for the NMDP/CIBMTR Research Sample Repository. Mr. Spellman holds a BA with a major in Biology and an MBS with a major in Molecular Immunology. He joined NMDP in 2000 and has provided management for the technical and operational aspects of immunobiology-research related projects for over 21 years. His research focuses on immunogenetic and immunobiologic factors that influence transplant outcomes, and he has authored/co-authored over 200 publications.

Mary Sproull

Mary Sproull is a research scientist in the Radiation Oncology Branch at the National Cancer Institute. Her biodosimetry work focuses on characterization of novel proteomic biomarkers of radiation exposure, and development of new dose prediction algorithms using animal models for total body, partial body, and organ specific radiation exposures.

Jill Tierney

Jill Tierney is a senior Data Analyst for the Division of Cellular Therapy and Stem Cell Transplantation at Dana-Farber Cancer Institute in Boston, MA. Her current primary responsibilities include identification of opportunities for program process improvement enabled by data captured in the division's case management and outcomes relational database, the creation of SQL queries to pull relevant data, and analysis and data visualization of results for presentation. Ms. Tierney has been DFCI's RITN Primary Coordinator since 2008. She coordinates completion of all annual task requirements. Ms. Tierney presented at the 2015 RITN workshop on the planning, implementation, and lessons learned from DFCI's full-scale RITN exercise conducted in 2014. She also was a member of the planning committee for the 2019 RITN workshop and the 2020 RITN Educational Webinar series training workgroup. Ms. Tierney holds a Master of Public Health degree in Epidemiology with an interdisciplinary concentration in Emergency Management from Boston University.

Mark VanDyke

Mark Van Dyke, M.Ed is the Manager of Emergency Preparedness for Spectrum Health. Along with overseeing the Emergency Preparedness team for twelve hospitals, which include West Michigan's largest hospital and its only dedicated Children's Hospital, Mark develops and coordinates all education for disaster response for Spectrum Health, a 12 hospital 26,000 employee health system. Mark is an avid sports fan and has coached high school sports for 20 years. Mark has severed on the board of non-profits and is currently the CFO of The Van Dyke foundation, which he co-founded. Mark holds a bachelor's degree in business administration, and a master's degree in education. Mark and his wife Kelly live in Caledonia, MI and love spending time with their two children, Jonah & Elliana, and their really cool dog Lulu.

Al Villacara

Al Villacara, DMD, is a Director of Emergency Management for the Mount Sinai Health System (MSHS) in New York, NY. In this role, he leads MSHS-wide emergency preparedness education and training initiatives, including a wide variety of discussion and operations-based exercises as well as mandatory educational modules for all staff. Additionally, he leads preparedness, response, recovery, and mitigation efforts for a wide variety of disaster scenarios (with a recent MSHS focus on ongoing COVID-19 response, building decontamination capabilities, and armed intruder/active shooter preparedness). Prior to joining MSHS, Dr. Villacara held emergency management leadership positions with a number of prominent organizations, including The Cadmus Group, NewYork-Presbyterian Healthcare System, New York City Office of Emergency Management, and the United States Air Force. He holds a Doctor of Dental Medicine degree from Tufts University School of Dental Medicine in Boston, MA and a Bachelor of Science in Biology degree from Georgetown University in Washington, DC.

Li Wang

Li Wang is an HJF Scientist, Armed Forces Radiobiology Research Institute, Uniformed Services University of the Health Sciences; Assistant Professor, Department of Pathology, Uniformed Services University of the Health Sciences; Bethesda, MD. I received my Ph.D. from University of Rochester School of Medicine and Dentistry, Rochester, NY in the Department of Pharmacology. My graduate study and postdoctoral training focused on vascular biology and cardiovascular diseases. In 2018, I joined the Armed Forces Radiobiology Research Institute (AFRRI), Uniformed Services University of the Health Sciences (USUHS) as a HJF Scientist. In 2021, I was appointed as an Assistant Professor in the Department of Pathology, USUHS. My research focuses on the development of effective medical countermeasures to mitigate radiation injury combined with skin wounding (radiation combined injury, RCI). Although RCI comprises approximately 65% of injuries from a nuclear explosion, no FDA-approved countermeasures are available to mitigate RCI. Our group addresses the unmet need for the development of effective medical countermeasures to mitigate RCI in a mouse model, and also makes the effort to understand mechanisms behind the effects of radiation injury on skin wound healing. Our study has found that agents that improve endothelial functions should be considered to mitigate RCI. Since endothelial dysfunction is important for the development of cardiovascular diseases, my research interests also include studying the role of endothelial dysfunction in the pathogenesis of low/high doses of radiation-induced cardiotoxicity and understanding countermeasure mechanisms.

Julie Weber

Julie Weber is a Registered Pharmacist, Director of the Missouri Poison Center, Certified as a Specialist in Poison Information. She is a Clinical Instructor at Saint Louis University and Adjunct Clinical Instructor in Pharmacy at the University of Health Sciences and Pharmacy in St. Louis. Julie joined the team at SSM Health Cardinal Glennon Children's Hospital Poison Center in 1989 and has served as director of the Missouri Poison Center since 2008. She is the President for America's Poison Centers and is a member of the American Academy of Clinical Toxicology. In 2018, she was appointed as a member of the National Poison Data System Development Committee. Her vested interests reside in raising awareness of the value of poison centers and she works closely with the Missouri Department of Health to provide the Missouri Ready Line for public health emergencies.

Yujing Zou

I am a PhD candidate in Nelson Chao's laboratory in the Department of Pathology at Duke University. My primary research interests include characterizing the unique profiles of radioresistant T cells. I am particularly interested in enhancing T cell reconstitution following total body irradiation (TBI) through the modulation of T cell metabolism and mechanisms associated with the homeostatic proliferation process. Previously, I have utilized single-cell sequencing to determine unique T cell subsets and metabolic requirements for T cell reconstitution following TBI exposure. I am currently investigating the effect of NT-I7, a long-acting homodimeric recombinant human IL-7, on T cell recovery post-TBI through in vivo imaging models and relevant functional assays. Prior to this, I received my Bachelor's degree at the University of Toronto, completing a thesis project on γδT cell development in the laboratory of Juan Carlos Zúñiga-Pflücker. I have extensive experience working with immunophenotyping and functional assays associated with T cell biology, as well as expertise in utilizing mouse models for TBI to investigate the immune cell recovery process following radiation exposure.