

NON-REIMBURSABLE MEMORANDUM OF UNDERSTANDING BETWEEN

**The David Grant Medical Center (DGMC)  
Travis Air Force Base**

AND

**The National Aeronautics and Space Administration Human Research Program, Space  
Radiation Element (NASA HRP SRE)**

FOR

Space Ionizing Radiation Collaborative Investigations  
MOU NUMBER 38839

This is a Memorandum of Understanding (MOU) between the **David Grant Medical Center (DGMC), Travis Air Force Base, CA**, and the **National Aeronautics and Space Administration Human Research Program, Space Radiation Element (NASA HRP SRE)**. When referred to collectively, the **David Grant Medical Center (DGMC)** and the **National Aeronautics and Space Administration Human Research Program, Space Radiation Element (NASA HRP SRE)** are referred to as the “Parties”.

1. BACKGROUND: On January 25, 2023, NASA HRP SRE and DGMC conducted a panel meeting to discuss possible collaboration on specific projects overlapping both DGMC Space & Austere Medicine care of pilots and NASA care of astronauts, with a focus on space radiation research. Both Parties independently identified the risk of developing cancer to be the major priority for space radiation exposure and strategized to address personal risks to space radiation. Further, both Parties expressed a combined interest in exploring space radiation’s impact on the central nervous system, the cardiovascular system, and other organ systems. Both Parties are additionally interested in developing countermeasures, preventive measures, and innovative healthcare solutions to improve the welfare of aerospace travelers. Due to the parallel work occurring at both DGMC and NASA HRP SRE, the Parties expressed an interest in starting a formal collaboration.

2. AUTHORITIES:

- 2.1 DoDI 4000.19, Support Agreements, 16 December 2020
- 2.2 National Aeronautics and Space Act (51 U.S.C. § 20113(e))
- 2.3 Other directives, as required

3. PURPOSE: To collaborate on research investigations involving space radiation exposure, including mitigating and preventing the risks of radiation exposure, individual cancer risk characterization, health surveillance through early cancer detection, and compound-based countermeasures against the carcinogenic effects of radiation exposure.

4. UNDERSTANDINGS OF THE PARTIES:

4.1. The **DGMC will:**

4.1.1. Share porcine blood and post-mortem tissue samples exposed to ionizing radiation (X-ray) from DGMC IACUC-approved protocol FDG20230029A titled “*A pilot study of whole-body effects of radiation exposure in Yucatan miniature pigs (Sus scrofa domesticus)*” with NASA HRP SRE, to include but not limited to: brain, heart, eyes, lungs, kidneys, bone marrow, and liver within 3 months of DGMC collection of the samples.

4.1.2. Share the DGMC 2023 AsMA podium presentation slide set with NASA HRP SRE within 1 month of agreement initiation.

4.1.3. Share the results of future gene marker studies from the UK BioBank or other databases with NASA HRP SRE.

4.2. **The NASA HRP SRE will:**

4.2.1. Share their unpublished but completed work advising the specific effects of nutraceuticals on mice with DGMC as well as tested mouse models, in the hopes of better directing the proposed DGMC nutraceutical animal studies on mice and minipigs within 3 months of agreement initiation.

4.2.2. Share de-identified and aggregated genomic data from the forthcoming “NASA-omics” platform consistent with appropriate data release through the Life Sciences Data Archive with DGMC to provide the basis for study proposals related to aviators flying at high altitudes and/or high latitudes within 1 year of agreement initiation.

4.2.3. Share unpublished and published NASA documentation on strategic and legal personal risk counseling for astronauts regarding radiation exposure with DGMC within 6 months of agreement initiation or when documents become available.

4.2.4. Share research results from studies conducted using DGMC porcine samples with DGMC within 6 months of completing the study.

4.2.5. Perform necessary analysis using equipment/devices (e.g., Thermoluminescent dosimeters) that are necessary for research collaboration projects under this MOU.

4.2.6. Send NASA personnel to DGMC as necessary to assist in performing required postmortem dissections on porcine carcasses.

4.2.7. Arrange for shipment of tissue samples covered under this MOU from DGMC to NASA JSC.

5. **PERSONNEL:** Each Party is responsible for all costs of its personnel, including pay and benefits, support, and travel. Each Party is responsible for supervision and management of its personnel.

6. **GENERAL PROVISIONS:**

6.1. POINTS OF CONTACT: The following points of contact will be used by the Parties to communicate in the implementation of this MOU. Each Party may change its point of contact upon reasonable notice to the other Party.

6.1.1. For the DGMC—

6.1.1.1 Primary: Lt Col Brandon M. Tourtillott,  
Brandon.m.tourtillott.mil@health.mil  
Director Clinical Investigation Facility  
(707) 423-7262

6.1.1.2. Alternate: Randy Claxton, RN, BSN, MSN, MS, NP, HCI  
Randy.o.claxton.civ@health.mil  
Deputy Director Clinical Investigation Facility  
(707)-423-7296

6.1.2. For the NASA HRP SRE—

6.1.2.1. Primary: Jason Weeks,  
jason.weeks-1@nasa.gov  
Space Radiation Element Manager  
(832)-248-6508

6.1.2.2. Alternate: Ryan Norman,  
ryan.b.norman@nasa.gov  
Space Radiation Deputy Element Manager  
(757)-864-2185

6.2. CORRESPONDENCE: All correspondence to be sent and notices to be given pursuant to this MOU will be addressed, if to the DGMC, to—

6.2.1. For mail: 60th Medical Group – David Grant USAF Medical Center  
Clinical Investigation Facility / SGSE  
101 Bodin Circle  
Travis Air Force Base, CA 94535  
For email: brandon.m.tourtillott.mil@health.mil

and, if to the NASA HRP SRE, to—

6.2.2. For mail: NASA Parkway, Mailcode SK211, Houston, TX 77058  
For email: jason.weeks-1@nasa.gov

6.3. FUNDS AND MANPOWER: This MOU does not document nor provide for the exchange of funds or manpower between the Parties nor does it make any commitment of funds or resources. No provision in this MOU will be interpreted to require obligation or payment of funds.

6.4. MODIFICATION OF MOU: This MOU may only be modified by the written agreement of the Parties, duly signed by their authorized representatives. This MOU will be reviewed no less often than at the mid-point of its term and around the anniversary of its effective date in its entirety.

6.5. DISPUTES: Disputes regarding this agreement will be resolved in accordance with guidance provided in the Volume 1, Part 2, Chapter 4700, Appendix 6, Paragraph 2.3.4 of the U.S. Department of the Treasury Financial Manual.

6.6. TERMINATION OF UNDERSTANDING: This MOU may be unilaterally terminated by either Party by giving at least 10 days written notice to the other Party. The MOU may also be terminated at any time upon the mutual written consent of the Parties.

6.7 PRIORITY OF USE: Any schedule or milestone in this MOU is estimated based upon the Parties' current understanding of the projected availability of its respective goods, services, facilities, or equipment. In the event that either Party's projected availability changes, NASA or DGMC respectively, shall be given reasonable notice of that change, so that the schedule and milestones may be adjusted accordingly. The Parties agree that NASA's and DGMC's use of its own goods, services, facilities, or equipment shall have priority over the use planned in this MOU.

6.8 LIABILITY AND RISK OF LOSS: Each Party agrees to assume liability for its own risks arising from or related to activities conducted under this MOU.

6.9 INTELLECTUAL PROPERTY RIGHTS – DATA RIGHTS – FREE EXCHANGE OF DATA: NASA and DGMC agree that the information and data exchanged in furtherance of the activities under this MOU will be exchanged without use and disclosure restrictions unless required by national security regulations (e.g., classified information) or as otherwise provided in this MOU or agreed to by NASA and DGMC for specifically identified information or data (e.g., information or data specifically marked with a restrictive notice). Unless otherwise agreed upon by NASA and DGMC, custody and administration of inventions made (conceived or first actually reduced to practice) under this MOU will remain with the respective inventing Party. In the event an invention is made jointly by employees of the Parties (including by employees of a Party's contractors or subcontractors for which the U.S. Government has ownership), the Parties will consult and agree as to future actions toward establishment of patent protection for the invention

6.10 RELEASE OF GENERAL INFORMATION TO THE PUBLIC AND MEDIA: NASA or DGMC may, consistent with Federal Law and this Agreement, release general information regarding its own participation in this MOU as desired. Insofar as participation of the other Party in this MOU is included in a public release, NASA and DGMC will seek to consult with each other prior to any such release, consistent with the Parties' respective policies. Pursuant to Section 841(d) of the NASA Transition Authorization Act of 2017, Public Law 11510 (the "NTAA"), NASA is obligated to publicly disclose copies of all agreements conducted pursuant to NASA's 51 U.S.C. §20113(e) authority in a searchable format on the NASA website within 60 days after the agreement is signed by the Parties. The Parties acknowledge that, if this MOU is entered into pursuant to NASA's 51 U.S.C. §20113(e) authority, this MOU will be disclosed, without redaction, in accordance with the NTAA.

6.11 CONTINUING OBLIGATIONS: The rights and obligations of the Parties that, by their nature, would continue beyond the expiration or termination of this Agreement, e.g., “Liability and Risk of Loss” and “Intellectual Property Rights” and related clauses shall survive such expiration or termination of this Agreement.

6.12 APPLICABLE LAW: U.S. Federal Law governs this MOU for all purposes, including, but not limited to, determining the validity of the MOU, the meaning of its provisions, and the rights, obligations and remedies of the Parties.

6.13. TRANSFERABILITY: This MOU is not transferable except with the written consent of the Parties.

6.14. ENTIRE UNDERSTANDING: It is expressly understood and agreed that this MOU embodies the entire understanding between the Parties regarding the MOU’s subject matter, thereby superseding all prior understandings of the Parties with respect to such subject matter.

6.15. EFFECTIVE DATE: This MOU takes effect beginning on the day after the last Party signs.

6.16. EXPIRATION DATE: This MOU expires 5 years after its execution.

6.17. CANCELLATION OF PREVIOUS MOU: Not applicable.

6.18. NO THIRD PARTY BENEFICIARIES: Nothing in this MOU, express or implied, is intended to give to, or will be construed to confer upon, any person not a party any remedy or claim under or by reason of this MOU and this MOU will be for the sole and exclusive benefit of the Parties.

6.19. OCCUPATIONAL HEALTH PROGRAM: Each party is responsible for their own personnel and their own Occupational Health Programs. DGMC will not enroll NASA HRP SRE personnel into DGMC’s Occupational Health Program. While on site at DGMC, all applicable policies from either party regarding visiting researchers will be followed and are not modified by the scope of this agreement.

6.20 PUBLICATION AND AUTHORSHIP: If NASA HRP SRE chooses to publish test and evaluation activities conducted under this MOU, NASA HRP SRE will provide a copy of the proposed publication (or, if not feasible, a summary of the proposed publication) to DGMC prior to publication. The DGMC has the right to ask NASA HRP SRE to give appropriate credit to DGMC for its contributions under this MOU, by providing written notice to NASA HRP SRE within thirty (30) days of receiving the proposed publication. The DGMC will provide NASA HRP SRE with a copy of any proposed publication that discloses or concerns any report or Test Data received from NASA HRP SRE under this MOU.

APPROVED:

FOR DGMC

FOR NASA HRP SRE

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Signature

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Signature

**MELISSA J. DOOLEY**

**DAVID BAUMANN, BS**

**Commander, 60th Medical Group**

**Director, Human Research Program**

**Director, DHA Sacramento Market**

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