Fiscal Year:	FY 2008	**Task Last Updated:**	FY 06/02/2008
PI Name:	Prisk, G. Kim Ph.D., D.Sc.		
Project Title:	Clearance of Particles Depositing in the Human Lung in Low Gravity		
Division Name:	Human Research		
Program/Discipline:	NSBRI		
Program/Discipline--Element/Subdiscipline:	NSBRI--Human Factors and Performance Team		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **SHFH**:Space Human Factors & Habitability (archival in 2017)		
Human Research Program Risks:	(1) **Dust**:Risk of Adverse Health and Performance Effects of Celestial Dust Exposure (2) **Medical Conditions**:Risk of Adverse Health Outcomes and Decrements in Performance Due to Medical Conditions that occur in Mission, as well as Long Term Health Outcomes Due to Mission Exposures (3) **Renal Stone**:Risk of Renal Stone Formation		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
PI Email:	kprisk@ucsd.edu	**Fax:**	FY 858-534-6046
PI Organization Type:	UNIVERSITY	**Phone:**	858-534-3233
Organization Name:	University of California, San Diego		
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City:	La Jolla	**State:**	CA
Zip Code:	92093-0852	**Congressional District:**	53
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	2007 Crew Health NNJ07ZSA002N
Start Date:	06/01/2008	**End Date:**	05/31/2012
No. of Post Docs:		**No. of PhD Degrees:**	
No. of PhD Candidates:		**No. of Master' Degrees:**	
No. of Master's Candidates:		**No. of Bachelor's Degrees:**	
No. of Bachelor's Candidates:		**Monitoring Center:**	NSBRI
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Bennett, William (University of N. Carolina at Chapel Hill) Darquenne, Chantal (University of California, San Diego)		
Grant/Contract No.:	NCC 9-58-HFP01604		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	The deposition of particulate matter in the human lung is known to bring with it both long-term and short-term adverse health consequences. The deposition of particles in the lung is strongly influenced by gravitational sedimentation. Studies by this group have shown that normal gravity provides a screening effect whereby inhaled particulate matter larger than 0.5 micron is mainly deposited in the larger airways where it is cleared by mucociliary clearance transport within about one day. However, in low gravity, such as that on the surface of the moon (about 1/6 Earth's gravity) and Mars (about 3/8 of Earth's gravity), this protective 'gravitational screening' is less efficient, and as a result, particles are deposited in the sensitive alveolar regions of the lung where residence times are much longer. Further, there is evidence that the dust on the surface of the moon may possess potent toxicological properties. We hypothesize that clearance rates from the lung of particles deposited in low gravity will be substantially reduced compared to that in normal gravity, resulting in increased residence times of these particles in the periphery of the lung, enhancing their potential to cause lung damage. To test this hypothesis, we will measure the clearance rates (measured in normal gravity) over a few hours to about 1-2 days, of radio-labeled particles deposited in healthy humans both in normal and in low gravity corresponding to the lunar surface during parabolic flight. These data will provide a comprehensive assessment of alterations in the clearance rate of particles inhaled under normal gravity conditions compared to particles inhaled under conditions of lunar gravity. Such an assessment is needed to determine the degree of effort and cost required to control lunar dust within a planned lunar outpost.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2008.
Bibliography Type:	Description: (Last Updated: 03/11/2021)