

Fiscal Year:	FY 2007	Task Last Updated:	FY 09/11/2009
PI Name:	Lam, Chiu-wing Ph.D.		
Project Title:	Pulmonary Toxicity Studies of Lunar Dust in Mice and Rats		
Division Name:	Human Research		
Program/Discipline:	HUMAN RESEARCH		
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Environmental health		
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 In-Mission Health and Performance Effects and Long-Term Health Effects Due to Celestial Dust Exposure		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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City:	Houston	State:	TX
Zip Code:	77058	Congressional District:	22
Comments:			
Project Type:	Ground	Solicitation / Funding Source:	Directed Research
Start Date:	10/02/2006	End Date:	12/31/2010
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: NASA JSC		
Contact Monitor:	Woolford, Barbara	Contact Phone:	218-483-3701
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Flight Program:			
Flight Assignment:	NOTE: Start/end dates changed to 10/2/2006-12/31/2010 (previously 4/30/2006-1/31/2011) per B. Woolford/JSC via S. Steinberg-Wright/JSC (9/2009)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):			
Grant/Contract No.:	Directed Research		
Performance Goal No.:			
Performance Goal Text:			

Task Description:	NASA will build an outpost on the lunar surface for long-duration human habitation and research. The surface of the Moon is covered by a layer of fine, reactive dust, and the living quarters in the lunar outpost are expected to be contaminated by lunar dust. NASA established the Lunar Airborne Dust Toxicity Advisory Group (LADTAG) to evaluate the risk of exposure to the dust and to establish safe exposure limits for astronauts working in the lunar habitat. Because the toxicity of lunar dust is not known, LADTAG has recommended investigating its toxicity in the lungs of laboratory animals. After receiving this recommendation, NASA directed the JSC Toxicology Laboratory to determine the pulmonary toxicity of lunar dust in exposed rodents. The rodent pulmonary toxicity studies proposed here are the same as those proposed by the LADTAG. Studies of the pulmonary toxicity of a dust are generally done first in rodents by intratracheal instillation (ITI). This toxicity screening test is then followed by an inhalation study, which requires much more of the test dust and is labor intensive. We succeeded in completing an ITI study on JSC-1 lunar dust simulant in mice (Lam et al., Inhalation Toxicology 14:901-916, 2002, and Inhalation Toxicology 14: 917-92, 2002), and are now proposing to do a study with Apollo lunar dust samples. This study will be similar to our study with the lunar dust simulant. Groups of mice and rats will be intratracheally instilled with a suspension of lunar dust. Lung lavage fluid will be assayed for biomarkers of toxicity, and lung tissues will be examined microscopically for pathological lesions. In the study, reference dusts that have known toxicities and industrial exposure limits will be studied in parallel so the relative toxicity of lunar dust can be determined. The ITI results will also be useful for choosing an exposure concentration for the animal inhalation study on the lunar dust, which is included as a part of this proposal. The animal inhalation exposure will be conducted with lunar dust simulant will prior the inhalations exposure study with the lunar dust. The simulant exposure will ensure that the study techniques used with actual lunar dust will be successful. The results of ITI and inhalation studies with real lunar dust are essential for setting limits for human exposure to lunar dust.
Rationale for HRP Directed Research:	This research is directed because it contains highly constrained research, which requires focused and constrained data gathering and analysis that is more appropriately obtained through a non-competitive proposal.
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2007. Task added to Task Book in August 2009.
Bibliography Type:	Description: (Last Updated: 07/16/2023)