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Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Defense Health Program	DATE: March 2013
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APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE							
0130: <i>Defense Health Program</i> BA 2: <i>RDT&E</i>					PE 0603002HP: <i>Medical Advanced Technology (AFRRI)</i>							
COST (\$ in Millions)	All Prior Years	FY 2012	FY 2013 [#]	FY 2014 Base	FY 2014 OCO ^{##}	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
Total Program Element	-	0.739	0.298	0.304	-	0.304	0.310	0.321	0.326	0.332	Continuing	Continuing
242A: <i>Biodosimetry (USUHS)</i>	-	0.444	0.179	0.183	-	0.183	0.186	0.193	0.195	0.199	Continuing	Continuing
242B: <i>Radiation Countermeasures (USUHS)</i>	-	0.295	0.119	0.121	-	0.121	0.124	0.128	0.131	0.133	Continuing	Continuing

[#] FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

^{##} The FY 2014 OCO Request will be submitted at a later date

A. Mission Description and Budget Item Justification

For the Uniformed Services University of the Health Sciences/ Armed Forces Radiobiology Research Institute (USUHS/AFRRI), this program supports applied research for advanced development of biomedical strategies to prevent, treat and assess health consequences from exposure to ionizing radiation. It capitalizes on findings under PE 0602787HP, Medical Technology, and from industry and academia to advance novel medical countermeasures into and through pre-clinical studies toward newly licensed products. Program objectives focus on mitigating the health consequences from exposures to ionizing radiation(alone or in combination with other injuries) that represent the highest probable threat to US forces in current tactical, humanitarian and counterterrorism mission environments. Findings from basic and developmental research are integrated into focused advanced technology development studies to produce the following: (1) protective and therapeutic strategies; (2) novel biological markers and delivery platforms for rapid, field-based individual medical assessment; and (3) experimental data needed to build accurate models for predicting casualties from complex injuries involving radiation and other battlefield insults. The AFRRI, because of its multidisciplinary staff and exceptional laboratory and radiation facilities, is uniquely positioned to execute the program as prescribed by its mission.

B. Program Change Summary (\$ in Millions)	FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total
Previous President's Budget	0.748	0.298	0.304	-	0.304
Current President's Budget	0.739	0.298	0.304	-	0.304
Total Adjustments	-0.009	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.009	-			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Defense Health Program		DATE: March 2013
APPROPRIATION/BUDGET ACTIVITY 0130: <i>Defense Health Program</i> BA 2: <i>RDT&E</i>		R-1 ITEM NOMENCLATURE PE 0603002HP: <i>Medical Advanced Technology (AFRRI)</i>
Change Summary Explanation FY 2012: Realignment from DHP RDT&E, PE 0603002-Advanced Technology (AFRRI) (-\$0.009 million) to DHP RDT&E PE 0605502-Small Business Innovation Research (SBIR) Program (+\$0.009 million). FY 2013: No Change FY 2014: No Change		

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Exhibit R-2A, RDT&E Project Justification: PB 2014 Defense Health Program										DATE: March 2013		
APPROPRIATION/BUDGET ACTIVITY 0130: <i>Defense Health Program</i> BA 2: <i>RDT&E</i>					R-1 ITEM NOMENCLATURE PE 0603002HP: <i>Medical Advanced Technology (AFRRI)</i>				PROJECT 242A: <i>Biodosimetry (USUHS)</i>			
COST (\$ in Millions)	All Prior Years	FY 2012	FY 2013 [#]	FY 2014 Base	FY 2014 OCO ^{##}	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
242A: <i>Biodosimetry (USUHS)</i>	-	0.444	0.179	0.183	-	0.183	0.186	0.193	0.195	0.199	Continuing	Continuing

[#] FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

^{##} The FY 2014 OCO Request will be submitted at a later date

A. Mission Description and Budget Item Justification

Biodosimetry (USUHS): For the Uniformed Services University of the Health Sciences (USUHS), this program supports applied research for advanced development of biomedical and biophysical strategies to assess health consequences from exposure to ionizing radiation. It capitalizes on findings under PE 0602787HP, Medical Technology, and from industry and academia to advance novel biological markers and delivery platforms for rapid, field-based individual dose assessment and experimental data needed to build accurate models for predicting casualties from complex injuries involving radiation and other battlefield insults.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2012	FY 2013	FY 2014
Title: Biodosimetry (USUHS)	0.444	0.179	0.183
FY 2012 Accomplishments: <ul style="list-style-type: none"> - Expanded the panel of radiation-responsive protein biomarkers using non-human primate (NHP) radiation model; Demonstrated for the 1st time in NHP model, with potential applications in humans that "Serum Amyloid A" (SAA) is a new extremely sensitive early-phase biodosimeter of radiation injury and dose assessment and prognostic indicator of acute radiation sickness (ARS) outcome. - Continued efforts to establish an ARS Severity scoring system using NHP radiation model. - Establish a serum blood chemistry and hematology data base involving NHP response to 6.5 Gy radiation dose. - Initiated efforts to evaluate healthy human cohort for baseline inter-individual variation in candidate radiation biomarkers. - Sustained efforts to develop prototype radiation casualty management software applications for transitioning to DoD medical information platforms. - Initiated efforts to deploy beta version of rapid dose assessment algorithms (WinFRAT) on Institute's website for evaluation. - AFRRI contributions provided to HJF Joint Office of Technology (JOTT) on provisional patent application entitled: "BIODOSIMETRY PANELS AND METHODS". - New radiation-responsive biomarkers were discovered. Invention disclosure has been submitted to the HJF JOTT. 			
FY 2013 Plans: <ul style="list-style-type: none"> - Continue the further evaluation of discovered new radiation-responsive biomarkers using NHP radiation model. - Contribute to the preparation of the package to FDA to get approval for transition diagnostic utility of combined hematological and proteomic approach concept in triage biodosimetry applications devices (i.e., hand-held, field deployable). - Initiate efforts to establish protocol for analysis of samples from humans accidentally exposed to radiation. 			

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APPROPRIATION/BUDGET ACTIVITY 0130: <i>Defense Health Program</i> BA 2: <i>RDT&E</i>	R-1 ITEM NOMENCLATURE PE 0603002HP: <i>Medical Advanced Technology (AFRRI)</i>	PROJECT 242A: <i>Biodosimetry (USUHS)</i>	
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2012	FY 2013
<ul style="list-style-type: none"> - Sustain efforts to develop prototype radiation casualty management software applications for transitioning to DoD medical information platforms. - Create the ARS category score system based on multiple biodosimetric endpoints (i.e., peripheral blood cell counts and radiation-responsive protein expression profile). - Continue to provide necessary proof-of-concept dose-response data to transition combined proteomic and hematological concept for further development of diagnostic devices (i.e., hand-held, field deployable) and obtain necessary FDA approval. - Perform single dose discrimination for hematology and urine chemistries for animal models. <p>FY 2014 Plans:</p> <ul style="list-style-type: none"> - Continue the further evaluation of discovered new radiation-responsive biomarkers in animal models. - Prepare report for FDA on combined utility of hematological and protein biomarkers for biodosimetry applications in two FDA-required animal models. - Continue to provide necessary proof-of-concept dose-response data to transition combined proteomic and hematological concept for further development of diagnostic devices (i.e., hand-held, field deployable) and obtain necessary FDA approval. - Begin to develop the protocol on evaluated and newly developed protein biomarkers for use in human radiation accident cases. - Begin to develop the protocol on evaluated and newly developed protein biomarkers for use in human radiation accident cases. -Continue to figure out the fraction of radiation-responsive biomarkers contributed by physical trauma other than irradiation. -Complete NHP ARS severity scoring system. - Develop a radiation dose response algorithm for animal models. - Validate a radiation dose algorithm using independent samples. 			
Accomplishments/Planned Programs Subtotals		0.444	0.179
C. Other Program Funding Summary (\$ in Millions) N/A			
Remarks			
D. Acquisition Strategy N/A			
E. Performance Metrics By FY 2012 - Initiated efforts to characterize levels of radiation biomarkers using a large cohort of healthy human adults to establish a multivariate biomarker baseline. By FY 2013			

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APPROPRIATION/BUDGET ACTIVITY 0130: <i>Defense Health Program</i> BA 2: <i>RDT&E</i>	R-1 ITEM NOMENCLATURE PE 0603002HP: <i>Medical Advanced Technology (AFRRI)</i>	PROJECT 242A: <i>Biodosimetry (USUHS)</i>
<ul style="list-style-type: none"> - Continue the further evaluation of discovered new radiation-responsive biomarkers for ARS sub-syndromes in animal models. - Demonstrate accurate radiological detection from biological samples into quartiles of doses 0-1 Gy, 1-3 Gy, 3-6 Gy, 6-10 Gy, and greater than 10 Gy. - Create the ARS category score system based on multiple biodosimetric endpoints (i.e., peripheral blood cell counts and radiation-responsive protein expression profile). - Investigate combines utility of hematological and protein biomarkers for biodosimetry applications high (mixed field of neutrons and photons) LET total-body irradiations in TBI animal models. <p>By FY 2014</p> <ul style="list-style-type: none"> - Provide necessary proof-of-concept dose-response data to transition combined proteomic and hematological concept for further development of diagnostic devices (i.e., hand-held, field deployable) and obtain necessary FDA approval. - Prepare preliminary report for FDA on combined utility of hematological and protein biomarkers for biodosimetry applications in two animal models. - Begin to develop the protocol on evaluated and newly developed protein biomarkers for use in human radiation accident cases. - Complete protein biomarkers panel for either physical trauma before or after total-body irradiation. - Initiate study with partial-body irradiation combined with physical trauma. 		

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APPROPRIATION/BUDGET ACTIVITY 0130: Defense Health Program BA 2: RDT&E					R-1 ITEM NOMENCLATURE PE 0603002HP: Medical Advanced Technology (AFRRI)				PROJECT 242B: Radiation Countermeasures (USUHS)			
COST (\$ in Millions)	All Prior Years	FY 2012	FY 2013 [#]	FY 2014 Base	FY 2014 OCO ^{##}	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
242B: Radiation Countermeasures (USUHS)	-	0.295	0.119	0.121	-	0.121	0.124	0.128	0.131	0.133	Continuing	Continuing
[#] FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012												
^{##} The FY 2014 OCO Request will be submitted at a later date												
A. Mission Description and Budget Item Justification												
Radiation Countermeasures (USUHS): For the Uniformed Services University of the Health Sciences (USUHS), this program supports applied research for advanced development of biomedical strategies to prevent, treat and assess health consequences from exposure to ionizing radiation. It capitalizes on findings under PE 0602787HP, Medical Technology, and from industry and academia to advance novel medical countermeasures into and through pre-clinical studies toward newly licensed products. Program objectives focus on mitigating the health consequences from exposures to ionizing radiation alone or in combination with other injuries that represent the highest probable threat to US forces in current tactical, humanitarian and counterterrorism mission environments. Findings from basic and developmental research are integrated into highly focused advanced technology development studies yielding protective and therapeutic strategies.												
B. Accomplishments/Planned Programs (\$ in Millions)									FY 2012	FY 2013	FY 2014	
Title: Radiation Countermeasures (USUHS)									0.295	0.119	0.121	
FY 2012 Accomplishments:												
- Determined dose reduction factor for intramuscularly administered genistein nanosuspension is 1.16.												
- Determined effect of new IM injectable nanosuspension genistein formulation accelerated recovery of hematological parameters following high doses of ionizing radiation.												
- Determined that intramuscularly administered genistein suppressed interleukin1-beta, a radiation-induced pro-inflammatory cytokine.												
FY 2013 Plans:												
- Assess protective effects of genistein before irradiation in combination with best available mitigating agent to determine if a synergistic countermeasure agent regimen can be developed.												
- Determine whether estrogen plays a role in the radioprotective efficacy of genistein, which is a phytoestrogen.												
FY 2014 Plans:												
- Determine the role of intramuscularly administered genistein metabolites on radioprotection.												
- Determine serum blood levels of genistein at radiation protective doses.												
Accomplishments/Planned Programs Subtotals									0.295	0.119	0.121	

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C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
D. Acquisition Strategy N/A		
E. Performance Metrics By FY 2012 - Determined effect of new IM injectable nanosuspension genistein formulation accelerated recovery of hematological parameters following high doses of ionizing radiation. By FY 2013 - Assess protective effects of genistein before irradiation in combination with best available mitigating agent to determine if a synergistic countermeasure agent regimen can be developed. By FY 2014 - Determine the role of intramuscularly administered genistein metabolites on radioprotection. - Determine serum blood levels of genistein at radiation protective doses.		