Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Defense Health Agency	Date: May 2017
Appropriation/Budget Activity 0130: *Defense Health Program I* BA 2: *RDT&E*	**R-1 Program Element (Number/Name)** PE 0601117DHA *I Basic Operational Medical Research Sciences*

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	19.087	9.002	6.444	6.917	-	6.917	7.699	8.608	8.913	9.091	Continuing	Continuing
100A: *CSI - Congressional Special Interests*	3.815	2.161	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
371A: *GDF-Basic Operational Medical Research Sciences*	15.272	6.841	6.444	6.917	-	6.917	7.699	8.608	8.913	9.091	Continuing	Continuing

A. Mission Description and Budget Item Justification

Guidance for Development of the Force-Basic Operational Medical Research Sciences: This program element (PE) provides support for basic medical research directed toward greater knowledge and understanding of the fundamental principles of science and medicine that are relevant to the improvement of Force Health Protection. Research in this PE is designed to address areas of interest to the Secretary of Defense regarding Wounded Warriors, capabilities identified through the Joint Capabilities Integration and Development System, and sustainment of Department of Defense DoD and multi-agency priority investments in science, technology, research, and development. Medical research, development, test, and evaluation priorities for the Defense Health Program (DHP) are guided by, and will support, the Quadrennial Defense Review, the National Research Action Plan for Improving Access to Mental Health Services for Veterans, Service Members, and Military Families, the National Strategy for Combating Antibiotic Resistance, and the National Strategy for Biosurveillance. Research will support efforts such as the Precision Medicine Initiative which seeks to increase the use of big data and interdisciplinary approaches to establish a fundamental understanding of military disease and injury to advance health status assessment, diagnosis, and treatment tailored to individual Service members and beneficiaries, research focused on protection against emerging infectious disease threats, the advancement of state of the art regenerative medicine manufacturing technologies consistent with the National Strategic Plan for Advanced Manufacturing, the advancement of global health engagement and capitalization of complementary research and technology capabilities, improving deployment military occupational and environmental exposure monitoring, and the strengthening of the scientific basis for decision-making in patient safety and quality performance in the Military Health System. The program also supports the Interagency Strategic Plan for Research and Development of Blood Products and Related Technologies for Trauma Care and Emergency Preparedness. Program development and execution is peer-reviewed and coordinated with all of the Military Services, appropriate Defense agencies or activities and other federal agencies, to include the Department of Veterans Affairs, the Department of Health and Human Services, and the Department of Homeland Security. Coordination occurs through the planning and execution activities of the Joint Program Committees (JPCs), established to manage research, development, test and evaluation for DHP-sponsored research. The JPCs supported by this PE include military infectious diseases (JPC-2), military operational medicine (JPC-5), and combat casualty care (JPC-6). Funds in this PE are for basic research that promises to provide important new approaches to complex military medical problems. As the research efforts mature, the most promising efforts will transition to applied research (PE 0602115) or technology development (PE 0603115) funding.

In FY 2016, Congressional Special Interest (CSI) funds were provided for Core Research Funding. Because of the CSI annual structure, out-year funding is not programmed.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Defense Health Agency	Date: May 2017
Appropriation/Budget Activity 0130: *Defense Health Program* / BA 2: *RDT&E*	**R-1 Program Element (Number/Name)** PE 0601117DHA / *Basic Operational Medical Research Sciences*

B. Program Change Summary ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	7.397	6.444	6.917	-	6.917
Current President's Budget	9.002	6.444	6.917	-	6.917
Total Adjustments	1.605	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	2.161	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.556	-			

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2016	FY 2017
Project: 100A: *CSI - Congressional Special Interests*		
Congressional Add: *461A – Program Increase: Restore Core Research Funding Reduction (Army)*	2.161	-
Congressional Add Subtotals for Project: 100A	2.161	-
Congressional Add Totals for all Projects	2.161	-

Change Summary Explanation

FY 2016: Realignment from Defense Health Program, Research, Development, Test and Evaluation (DHP RDT&E), Program Element (PE) 0601117-Basic Operational Medical Research Sciences (-$0.556 million) to DHP RDT&E, PE 0605502-Small Business Innovation Research (SBIR) / Small Business Technology Transfer (STTR) Program (+$0.556 million).

FY 2016: Restore core research funding to the DHP RDT&E, PE 06011117-Basic Operational Medical Research Sciences (+$2.161 million).

FY 2017: Realignment from Defense Health Program, Research, Development, Test and Evaluation (DHP RDT&E), Program Element (PE) 0601117-Basic Operational Medical Research Sciences (-$1.161 million) to DHP O&M Account, Budget Activity Group (BAG) 3 - Private Sector Care (+$1.161 million).

FY 2017: Realignment from Defense Health Program, Research, Development, Test and Evaluation (DHP RDT&E), Program Element (PE) 0601117-Basic Operational Medical Research Sciences (-$1.812 million) to DHP RDT&E, PE 0603115-Medical Technology Development for Breast, Gynecological and Prostate Cancer Centers of Excellence (+$1.812 million).

FY 2018: No change.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Health Agency			Date: May 2017
Appropriation/Budget Activity 0130 / 2	R-1 Program Element (Number/Name) PE 0601117DHA / *Basic Operational Medical Research Sciences*	Project (Number/Name) 100A / *CSI - Congressional Special Interests*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
100A: *CSI - Congressional Special Interests*	3.815	2.161	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The FY 2016 Defense Health Program (DHP) Congressional Special Interest (CSI) funding was directed toward restoration of core research initiatives in Program Element (PE) 0601117 - Basic Operational Medical Research Sciences. Because of the CSI annual structure, out-year funding is not programmed.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017
Congressional Add: 461A – Program Increase: Restore Core Research Funding Reduction (Army)	2.161	-
FY 2016 Accomplishments: This CSI initiative was directed toward FY 2016 DHP core research initiatives in PE 0601117. Funds supported basic research in military operational medicine and radiation health effects (Project 371A).		
Congressional Adds Subtotals	2.161	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Health Agency			Date: May 2017
Appropriation/Budget Activity 0130 / 2	R-1 Program Element (Number/Name) PE 0601117DHA / *Basic Operational Medical Research Sciences*	Project (Number/Name) 371A / *GDF-Basic Operational Medical Research Sciences*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
371A: *GDF-Basic Operational Medical Research Sciences*	15.272	6.841	6.444	6.917	-	6.917	7.699	8.608	8.913	9.091	Continuing	Continuing

A. Mission Description and Budget Item Justification

Guidance for Development of the Force-Basic Operational Medical Research Sciences: Basic research described here focuses on enhancement of knowledge to support capabilities identified through the Joint Capabilities Integration and Development System process and sustainment of Department of Defense and multi-agency priority investments in science, technology, research, and development as stated in the Quadrennial Defense Review, the National Research Action Plan for Improving Access to Mental Health Services for Veterans, Service Members, and Military Families, and the National Strategy for Combating Antibiotic Resistance. This project supports basic research managed by the Joint Program Committees (JPCs) in the following areas: 1- Military Infectious Diseases basic research develops protection and treatment products for military relevant infectious diseases. 2- Military Operational Medicine basic research focuses on the development of medical countermeasures against operational stressors, prevention of physical and psychological injuries during training and operations, and maximizing the health, performance and fitness of Service members. 3- Combat Casualty Care basic research focuses on optimizing survival and recovery in injured Service members across the spectrum of care from point of injury through en route and facility care.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Project 371 GDF – Basic Operational Medical Research Sciences	6.841	6.444	6.917
Description: Provide support for basic medical research directed toward attaining greater knowledge and understanding of fundamental principles of science and medicine relevant to the improvement of medical care in operationally relevant environments. ***FY 2016 Accomplishments:*** Military infectious diseases research supported basic research laboratory studies in bacterial diseases prevention, treatment, and management to develop antibacterial agents targeting biofilms and multi-drug resistant organisms (MDROs), and host and microbial biomarkers for early detection of infection. Outcomes from FY 2015-16 laboratory studies identified bacterial targets for prevention/treatment of diseases caused by bacterial agents. These studies aligned with the National Strategy for Combating Antibiotic Resistance. Military operational medicine research identified mechanisms and characterized behavioral effects in small animal models resulting from low level repeated blast exposure, characterized the biomechanical responses of brain tissue resulting from direct transmission of blast waves through the skull using computational modeling that will guide the development of interventions for mitigating blast-induced brain injury. Started studies to understand brain mechanisms associated with substance abuse problems that affect adult decision making and behavioral health. Began studies to examine the relationship of pre-accession factors such as personal mental health, familial mental health, and factors promoting resilience both with self-reported, and			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Health Agency		Date: May 2017
Appropriation/Budget Activity 0130 / 2	**R-1 Program Element (Number/Name)** PE 0601117DHA / *Basic Operational Medical Research Sciences*	**Project (Number/Name)** 371A / *GDF-Basic Operational Medical Research Sciences*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
official post-deployment mental diagnoses after high-conflict deployments. Started studies to identify gender-specific factors that impact military task performance, defined minimal physical requirements for entry into physically demanding military occupations. Investigated applications of novel interventions and their neurobiological impact via animal models to evaluate effectiveness in treating PTSD symptoms. Conducted basic studies to define medical standards for noise injury criteria, and identified novel interventions to promote sleep quality and nonpharmacological approaches to reduce the need for sleep in order to sustain Warfighter readiness. Studied the effects of inadequate nutrition on gut microbiota composition and function. Studied biomarkers of toxicity to complex chemical mixtures and particulates using an in vitro model. ***FY 2017 Plans:*** Military infectious diseases research continues to support multi-year basic research laboratory studies in bacterial diseases prevention, treatment, and management in discovery and development of antibacterial agents for biofilms and multi-drug resistant organisms (MDROs, detection of MDROs, and biomarkers. successful approaches are being selected for continued funding. New studies are being initiated to address the remaining gaps related to infection caused by MDROs. These studies support the National Strategy for Combating Antibiotic Resistance. Military operational medicine research is characterizing the biomechanical responses of brain tissue in animal models due to the indirect mechanism of blast waves (through the vasculature) using computational modeling that guides the development of interventions for mitigating blast-induced brain injury. Conducting research to identify the role of individual and unit climate factors on aggression. Beginning studies to understand the basic mechanisms underlying psychological resilience to inform potential future intervention and assessment work. Performing epidemiological studies to identify the nature of the substance abuse problem in the military and possible unique contributing and protective factors. Continuing PTSD research on genetic vulnerabilities, disease models and mechanisms, and identification of intervention targets for pharmacologic treatment approaches. Establishing mechanisms of electrical stimulation of the brain on wakefulness and cognitive processes. Identifying physiological factors that may affect the performance of female Warriors. Combat casualty care basic research is identifying the molecular and cellular mechanisms involved in abnormal bleeding due to coagulopathy of trauma that occurs following severe trauma. These findings are used to generate diagnostic and therapeutic targets for further development. The Systems Biology Program in coagulopathy of trauma is completing. Focus is shifting toward exploiting findings to develop specific diagnostics and therapeutics for coagulopathy of trauma. ***FY 2018 Plans:*** Military infectious diseases research will continue to support multi-year basic research studies in bacterial diseases for the prevention, treatment and management in discovery and development of antibacterial agents for biofilms and multi-drug resistant organisms (MDROs), detection of MDROs, and biomarkers. Successful approaches will continue to be selected for funding.			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Defense Health Agency		Date: May 2017
Appropriation/Budget Activity 0130 / 2	**R-1 Program Element (Number/Name)** PE 0601117DHA / *Basic Operational Medical Research Sciences*	**Project (Number/Name)** 371A / *GDF-Basic Operational Medical Research Sciences*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
New studies will continue to be initiated to address the remaining gaps related to infection caused by MDROs. These studies will support the National Strategy for Combating Antibiotic Resistance. Military operational medicine research will continue to characterize the biomechanical responses of brain tissue in animal models due to the indirect mechanism of blast waves (through the vasculature) that will guide the development of interventions for mitigating blast-induced brain injury. Will continue to define the role of individual and unit climate factors on aggression. Will begin to define linkages between identified genetic markers and individual performance or health risks. Will continue studies aimed at understanding the basic mechanisms underlying psychological resilience to inform potential future intervention and assessment work. Will continue epidemiological studies to identify the nature of the substance abuse problem in the military and possible unique contributing and protective factors. Will conduct research to identify candidate targets and neurological systems for treatment and diagnostic indicators of PTSD. Will define solutions to prevent, mitigate and/or recover from fatigue after electrical brain stimulation. Will identify physical, physiological and psychosocial factors that may differentially impact the performance of female versus male Service members and gender-based susceptibility to musculoskeletal injury. Will establish mechanisms of molecular changes in the brain following exposure to inhaled toxicants. Combat casualty care will focus on developing an understanding of associated pathophysiologic (functional changes associated with injury) mechanisms using advanced hemostatic and resuscitation approaches in prolonged field care scenarios when evacuation is delayed.			
Accomplishments/Planned Programs Subtotals	6.841	6.444	6.917

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Research is evaluated through in-progress reviews, Defense Health Program-sponsored review and analysis meetings, quarterly and annual status reports, and progress reviews to ensure that milestones are met and deliverables are transitioned on schedule. The benchmark performance metric for transition of research conducted with basic science funding is the attainment of a maturity level that is typical of Technology Readiness Level 2 or the equivalent for knowledge products.