

Special Notice 14-SN-0003
Special Program Announcement for 2014 Office of Naval Research
“Acute Care Cover for Severely Injured Limbs”

I. INTRODUCTION

This announcement describes a research thrust titled “Acute Care Cover for Severely Injured Limbs” to be launched under the **ONRBAA14-001**, Long Range Broad Agency Announcement (BAA) for Navy and Marine Corps Science and Technology which can be found at: <http://www.onr.navy.mil/Contracts-Grants/Funding-Opportunities/Broad-Agency-Announcements.aspx>.

The research opportunity described in this announcement specifically falls under numbered paragraph 2 (items b, c, and f) of the sub-section titled Warfighter Performance (Code 34). The submission of proposals, their evaluation and potential execution of funds will be carried out as described in that BAA. The purpose of this announcement is to focus attention of the scientific community on the area to be studied and the planned timetable for the submission of proposals.

II. TOPIC DESCRIPTION

The Office of Naval Research (ONR) is interested in receiving proposals for the initial development of the “Acute Care Cover for Severely Injured Limbs” (ACCSIL). ACCSIL will be an advanced field dressing with capabilities beyond those currently available today for battlefield care of severely injured arms or legs. It is intended for application by corpsmen/medics/first responders at the point of injury and removal by medical care providers at Medical Treatment Facilities (MTF) that can provide definitive care. ACCSIL is intended for use on a wide variety of severe injuries including: avulsions, amputations, lacerations, compound and other fractures, thermal and chemical burns, degloving, deep and widespread abrasions, etc. This product will preserve viable tissue and diminish post-injury, negative, secondary sequelae in order to reduce morbidity and mortality. ACCSIL is intended to preserve the tissues of the injured limb in the best possible state during delays prior to evacuation and during evacuation itself. Optimally, at the time ACCSIL is removed, the limb, although injured, will be as fresh, well perfused, viable, and uninfected as at the moment of injury.

The final product will consist of two independent components: a) a **conformal cover** to serve as a physical barrier to contain/protect the remaining tissue, and b) an **internal bioactive coating** consisting of several pharmacological interventions to mitigate progressive injury and aid in preserving tissue, limb and systemic health.

Each of the two components, the **conformal cover** and the **internal bioactive coating**, should be considered separate products that can be developed and utilized alone. However, the intention is to combine the products into a single solution with the **conformal cover** and **internal bioactive coating** integrated, packaged and applied together.

This Special Notice has three opportunities for funding: 1) the **conformal cover**; 2) the **internal bioactive coating**; and 3) the **Prime Integrator** for integrating the two components. Offerors can respond to any or all of these three opportunities.

a) The **Conformal Cover (CC)** will: 1) prevent further penetration of environmental/foreign debris to mitigate risk of infection, 2) retain or slow loss of bodily fluids thereby reducing the volume of resuscitation fluid needed, 3) provide a barrier to fluid evaporation to prevent tissue dessication and reduce heat loss and subsequent patient hypothermia, 4) provide a barrier to entrance of bio- and chemical agents from environment or loss from contaminated wound to environment, 4) provide better wound management by employing a compressive, conformal cover that augments hemostasis but does not eliminate or replace tourniquet use, 5) provide support and reduced mobility for fractures and dislocations, 6) reduce pain via wound protection, infection suppression and non-irritating formulation, 7) provide regulation or control of gaseous or liquid atmosphere around wound, 8) be small and light enough to be carried in field medical kits and rugged enough to resist shredding by bone or shrapnel fragments during use, 9) be sized/shaped so that fewest sizes (preferably one) fit smallest to largest adult limbs, 10) contain **internal bioactive coating** and hold it in proximity to wound.

b) The **Internal Bioactive Coating (IBC)** will consist of a mixture of substances, likely pharmaceuticals, which will provide improved wound care. Desired capabilities include: 1) induction or acceleration of hemostasis, 2) antibiotic activity to reduce bacterial, fungal, bio-agent or other infections, 3) control pain locally, 4) non-reactivity between components, 5) applicability with or without the conformal cover.

Additional features may be desirable, including local and systemic immunomodulation, rapid cooling of burns to prevent progressive damage, repair or growth promoting/inhibiting factors and so on. However, these may be unachievable due to difficulties with substance interactions, lack of FDA approved compounds, uncertainty of physiological interactions, etc.

Desired capabilities of the ACCSIL **conformal cover**:

1. Be of an appropriate size and shape to fit into a personal field medical kit (threshold 600 gm, objective 250 gm, exclusive of container).
2. Have a shelf life of months to years without need for refrigeration.
3. Demonstrate the ability to maintain activity under very diverse environmental storage conditions experienced in military operations.
4. Must be physically flexible (at least at the onset of application) allowing rapid application.
5. Should securely and fully cover and conform to the size, shape of the wound site and limb to which it will be applied.
6. Complex methods of application or the need to extensively manipulate the limb should be avoided due to the exposed, painful and potentially anatomically distorted condition of the limb.
7. Provide a barrier function by covering and containing the wounded areas in order to prevent environmental contamination beyond that which occurred during wounding event. Potential environmental contaminants include bio- or chemical weapons, dirt, fuel, sea water, etc.
8. Novel form factors will receive strong consideration. One example of particular interest is a sleeve that could be drawn over the limb in the manner of a very loose fitting

stocking, which would become conformal after application. Conformality could be intentionally induced after positioning over wounds (e.g. application of activating chemicals or liquids).

9. However, the sleeve format is not an absolute requirement. Alternative formats, including an improved wrap in a rolled sheet (e.g. kitchen plastic wrap) may offer applicability to other types of wounds (advantageous), but may limit creativity with respect to novel approaches and application of **internal bioactive coating** (disadvantageous).
10. Demonstrate ability to apply, seal and fix in location rapidly and securely without additional fixators (clips, tape, etc.). Consequently, ability to adhere to self and skin may be advantageous.
11. Demonstrate ability to resist shredding by bone or shrapnel fragments during application and use.
12. Demonstrate ability to provide compression and support to the wound and limb may be desirable for enhancing hemostasis, stabilizing fractures, reducing edema or pain, slowing development of compartment syndrome. Compromise of tissue viability through excessive compression must be avoided.
13. Demonstrate ability to adjust degree of compression may be desirable whether adjustment occurs autonomously (e.g. stretchable material) or through manual manipulation (e.g. pneumatic pressure, lacing).
14. Intended duration of application before need for removal is up to 72 hrs under a wide range of physical and environmental conditions.
15. Maintain optical transparency throughout the entire wound dressing to allow visual inspection without removal of cover. Therefore, a means by which to drain blood or exudated fluids may be required.
16. Demonstrate the ability to provide protection without discoloring the wound which could complicate later debridement.
17. Provide permeability required to achieve desired local atmosphere within the cover such that conditions are optimal for best possible tissue health and preservation. Consider influx or efflux of atmospheric or chemically produced oxygen, carbon dioxide, water vapor, liquid water, contaminants such as dust, heat and other diffusible substances. Also leakage of infectious blood/fluid or bio-/chemical agents and components of **internal bioactive coating**.
18. Demonstrate optimized cover material properties to ensure optimal contact of **internal bioactive coating** with wounded tissues.
19. Consider that cover material could provide antibiotic function on interior surface to prevent formation of bacterial and fungal biofilms or incorporate antibiotic components which would leach out in a controlled manner contributing to infection control.
20. Demonstrate the ability to easily remove dressing from wound without adhesion or subsequent damage to the wound area or healthy skin.
21. Obtain IND approval for FDA phase I clinical trials and determine if any Toxic Substance Control Act registration is necessary for the active compounds and final product.
22. At end of proposed development plan the product must be at Technology Readiness Level 6: Representative model or prototype system tested in a relevant environment.

Desired capabilities of the ACCSIL **internal bioactive coating** include:

1. The product should be contained within the **conformal cover** when used together or be of an appropriate size and shape to fit into a field kit if used as a separate product (threshold 300 gm, objective 150 gm; exclusive of container).
2. Have a shelf life of months to years without need for refrigeration.
3. Demonstrate the ability to maintain activity under very diverse environmental storage conditions experienced in military operations.
4. Must have physical formulation (at least at the onset of application) allowing rapid application, full coverage and conformation to wounds of all shapes and sizes to which it will be applied.
5. Complex methods of application or the need to extensively manipulate the limb/wound should be avoided due to the exposed, painful and potentially anatomically distorted condition of the limb.
6. Demonstrate the ability to provide protection without discoloring the wound which could complicate later debridement.
7. Demonstrate translucency or transparency when in place on the wound.
8. Provide a mechanism for delivery of contained bio-active components in a controlled manner to the wound. Consideration should be given to potential for allergic reactions to components.
9. Demonstrate the ability to facilitate maintenance of tissue hydration and viability through prevention of tissue desiccation or maceration.
10. Demonstrate the ability to induce or accelerate hemostasis of hemorrhaging tissues and small vessels,
11. Demonstrate biostatic or antibiotic activity to reduce bacterial, fungal, bio-agent or other infections without inducing antibiotic resistance or immunocompromise.
12. Novel approaches to wound sterilization (e.g., cold gas plasma) will receive strong consideration provided they are not associated with excessive weight, overly burdensome employment or complicated logistical issues.
13. Demonstrate the ability to control pain locally without allowing systemic uptake of analgesic agents which could cause systemic cardiorespiratory depression or drug overdose.
14. Demonstrate the ability to easily remove coating materials from wound without strong adhesion or subsequent damage to the wound area.
15. Provide for optimal wound oxygenation, via diffusion of atmospheric oxygen across conformal cover, chemical generation of oxygen within the cover or other approach.
16. Demonstrate functionality and benefit of other proposer-identified factors such as growth promoters/inhibitors, immunomodulators, chelators, etc.
17. Demonstrate compatibility or non-reactivity between ingredients of the **internal bioactive coating**.
18. Demonstrate ability for use together with **conformal cover** and alone without the cover for use on wounds where the cover is not practical (e.g. head, thorax). Bioactive coating could be applied as a gel, spray or powder depending on formulation.
19. Obtain IND approval for FDA phase I clinical trials and determine if any Toxic Substance Control Act registration is necessary for the active compounds and final product.

20. At end of proposed development plan the product must be at Technology Readiness Level 6: Representative model or prototype system tested in a relevant environment.
21. Strong preference will be given for drugs and biologics that are already FDA approved or in late Phase III clinical trials. Funding and project duration are not sufficient to support development and FDA approval of novel pharmaceuticals.

Expanded, novel capabilities for both the **conformal cover** and the internal coating (that are logistical feasible to field) shall receive strong consideration for funding.

Successful development of these capabilities will prevent morbidity and mortality associated with secondary damage that ensues after the onset of the initial physical trauma. Overall, this two-component system must demonstrate compatibility as a concerted system. This product shall also not interfere with bandage removal by advanced medical providers. Interactions among the materials, bio-active components, and patients must be thoroughly studied, and consequently followed by FDA approval before a device can be fielded.

III. FULL PROPOSAL SUBMISSION AND AWARD INFORMATION

Full proposals should be submitted under ONRBAA14-001 by January 27, 2014. Full Proposals received after that date will be considered as time and availability of funding permit. Full instructions are outlined at the following link <http://www.onr.navy.mil/~media/Files/Funding-Announcements/BAA/2014/14-001.ashx>. Proposal format/templates must be consistent with the BAA. Budgets for multi-year proposals should align with government fiscal years (01OCT-30SEP). ONR anticipates that both grants and contracts will be issued for this effort. Full proposals for contracts should be submitted in accordance with the instructions at Section IV, Application and Submission Information, item 2.b, Full Proposals and item 6, Submission of Full Proposals for Contracts, Cooperative Agreements, and Other Transactions. Full proposals for grants should be submitted in accordance with the instructions at Section IV of ONRBAA14-001, Application and Submission Information, item 5, Submission of Grant Proposals through Grants.gov. All full proposals for grants must be submitted through www.grants.gov. The following information must be completed as follows in the SF 424 to ensure that the application is directed to the correct individual for review: Block 4a, Federal Identifier: Enter N00014; Block 4b, Agency Routing Number, Enter the three (3) digit Program Office Code (342) and the Program Officer's name, last name first, in brackets [Bentley, Timothy]. All attachments to the application should also include this identifier to ensure the proposal and its attachments are received by the appropriate Program Office.

The period of performance for the entire ACCSIL effort is 48 months. Therefore, the period of performance for proposals should be no longer than 48 months. ONR anticipates funding multiple awards for this effort totaling no more than \$15M for all awards. Budget for Year 1 should run from the estimated start date through the end of the Federal fiscal year, 30 September 2014. Budgets for following years should run from 1 October to 30 September for each year.

For contract proposals (i.e., non-grants) that include animal and/or human studies it is suggested, although not required, to structure as a base that is without animal/human studies. Animal and/or human studies can be added as options to the proposal if desired. Overall, if selected for funding,

this will allow for expedited initial processing of funds. To be clear, respondents are not required to do so, and this WILL NOT be used as selection criteria for proposals.

Although ONR expects the above described program plan to be executed, ONR reserves the right to make changes. Receipt of proposals by ONR does not guarantee funding. This Special Notice does not commit the Government to fund any proposals received.

IV. SIGNIFICANT DATES

Recommended Full Proposal Submission	January 27, 2014
Notification of Selection: Full Proposals *	March 15, 2014
Estimated Date of Awards *	July-September 2014

Note: * These are approximate dates.

V. POINTS OF CONTACT

In addition to the points of contact listed in ONRBAA14-001, the specific points of contact for this announcement are listed below:

Technical Point of Contact:

Timothy B. Bentley, PhD
E-mail: Timothy.B.Bentley@navy.mil
Phone: (703) 696-4251

Business Point of Contact:

Mr. Sean M. Palmer
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Phone: (703) 696-0942

VI. SUBMISSION OF QUESTIONS

Any questions regarding this announcement must be provided to the Technical Point of Contact and/or the Business Point of Contact listed above. All questions shall be submitted in writing by electronic mail. Questions regarding this special notice must be submitted via email to Dr. Timothy B. Bentley(Timothy.B.Bentley@navy.mil) no later than 1700 ET, 9 JAN 2014.

Title the subject line “**14-SN-0003** Questions.” Questions after this date may not be answered.

Answers to questions submitted in response to this Special Notice will be addressed in the form of an Amendment and will be posted to the following web pages:

Federal Business Opportunities (FEDBIZOPPS) Webpage – <https://www.fbo.gov/>
Grants.gov Webpage – <http://www.grants.gov/>

ONR Special Notice Webpage - <http://www.onr.navy.mil/Contracts-Grants/Funding-Opportunities/Special-Notices.aspx>