

## MITIGATION - SCIENCE AND TECHNOLOGY ADVANCES FOR CHEMICAL AND BIOLOGICAL HAZARD MITIGATION

# Efficacy of RSDL® (Reactive Skin Decontamination Lotion Kit) against Novichok Nerve Agents

**Vladimir Savransky** Emergent BioSolutions Inc.   **Alex Cornelissen** TNO Defence, Safety and Security, CBRN Protection, Rijswijk, The Netherlands   **Roland van den Berg** TNO Defence, Safety and Security, CBRN Protection, Rijswijk, The Netherlands   **Jan Langenberg** TNO Defence, Safety and Security, CBRN Protection, Rijswijk, The Netherlands   **Marco van Groi** TNO Defence, Safety and Security, CBRN Protection, Rijswijk, The Netherlands   **John Pittman** Emergent BioSolutions Inc.  
**Laura Cochran** Emergent BioSolutions Inc.

### Introduction/Background

RSDL® kit, a standard for skin decontamination of chemical warfare agents, has established efficacy against traditional vesicant and organophosphate agents. However, there's a lack of information on the efficacy against Novichok agents. This study evaluated the neutralization and ability of RSDL kit to improve survival following percutaneous exposure to the Novichok agent, A234, in a guinea pig model.

### Methods

An in vitro test assessed the neutralizing effect of RSDL lotion on A230, A232, and A234 compared to control (training, t-RSDL), using Phosphorus-31 NMR spectroscopy.

An in vivo study was conducted to determine the efficacy of RSDL lotion + removal after 2 minutes at various time points (5 min, 30 min, or repeatedly at 5, 15, and 30 min) after percutaneous (supra)lethal challenge with A234. Two additional groups of animals also received RSDL lotion + removal immediately when cholinergic signs appeared, with the second group also receiving additional lotion + removal at 10 and 25 minutes. Efficacy was assessed as survival at 24 hours and/or survival time. Blood samples were also taken to measure cholinesterase (ChE) activity.

### Results

RSDL lotion neutralized A230, A232, and A234 in vitro with half-lives of <1, 18, and 36 min, respectively.

All animals treated with RSDL lotion + removal at 5 min, 30 min, or repeatedly at 5, 15, and 30 min after lethal challenge survived without any cholinergic intoxication. There were no survivors among additional groups treated with RSDL lotion + removal upon cholinergic signs. All animals had markedly inhibited ChE activity at 24 hours or upon death. Nevertheless, repeated treatment with RSDL lotion + removal was much more effective at restoring ChE activity.

### Conclusion/Discussion

RSDL lotion + removal prevented mortality when used within 30 min after lethal challenge with percutaneously applied A234; repeated treatment may also prevent a decrease in ChE activity.