

HORIZON-CL3-2022-DRS-01-09 Enhanced capacities of first responders more efficient rescue operations, including decontamination of infrastructures in the case of a CBRN-E event

Ideas for the project:

- innovative decontamination of chemical or biological agents
- innovative detection of chemical threats
- innovative medical countermeasures for chemical threats
- enhanced drug delivery and release
- nanoformulations for drug delivery and release
- bioavailability of medical countermeasures
- safe decontamination tools for the first responders

Infrastructure offered:

- over 500 m² of scientific laboratories
- ability to work with nerve agent surrogates
- ability to produce and apply human recombinant enzymes
- GMO BSL-2 laboratories
- analytical chemistry unit
- enzymology unit
- metabolomics unit
- infrastructure for testing of prototypes
- skilled personnel (>30) in analytical chemistry, biochemistry, pharmaceutical sciences, synthetic chemistry

Former project related to the topic:

1. Biodistribution and real-time monitoring of free or apoferritin encapsulated charged cholinesterase reactivators
2. Modified nucleophiles for reactivation of cholinesterases inhibited by organophosphorus compounds
3. Encapsulation of cholinesterase reactivators using apoferritin for enhanced bioavailability in CNS
4. Novel butyrylcholinesterase reactivators for pseudo-catalytic scavenging of organophosphates (V4-Korea)
5. ORCHIDS - Evaluation, optimisation, trialling and modelling procedures for mass casualty decontamination

Partners in previous research projects:

Chemprotect (CZ), Florida International University (US), Health Protection Agency (UK), Institute for Medical Research and Occupational Health (HR), Jagiellonian University (PL), Korean Institute of Chemical Technology (KR), Military Institute of Engineering (BR), Swedish Defence Research Agency (SE), University of Defence (CZ), University Hospital in Hradec Kralove (CZ), University St Andrews (UK)

Examples of published work:

- Zorbaz, T.; ... Musilek, K.* Pyridinium oximes with ortho-positioned chlorine moiety exhibit improved physicochemical properties and efficient reactivation of human acetylcholinesterase inhibited by several nerve agents. *Journal of Medicinal Chemistry*. 2018, vol. 61, p. 10753. <https://doi.org/10.1021/acs.jmedchem.8b01398>
- Misik, J.; ... Kuca, K.* In vivo decontamination of the nerve agent VX using the domestic swine model. *Clinical Toxicology*. 2012, vol. 50, p. 807. <https://doi.org/10.3109/15563650.2012.720986>

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