Inno4Vac OPEN CALL Sub-Topic 1

Recall of memory responses, or formation of new antibody responses, following sequential exposures to variable viruses such as influenza

- **Background on Inno4Vac:**
  Vaccines are among the most effective measures to protect from infectious diseases. However, vaccine development remains costly, time-consuming, and risky. The EU-funded Inno4Vac project proposes an ambitious programme to harness the latest advances in immunology, disease modelling, and modelling for tackling persistent scientific bottlenecks in vaccine development and for de-risking and accelerating this process. Artificial intelligence, combined with big data and computational modelling, is used to build an open-access and cloud-based platform for *in silico* vaccine efficacy assessment and development. Controlled human infection models and cell-based human *in vitro* 3D models are developed to enable early evaluation of vaccine efficacy and prediction of immune protection. Finally, an open source *in silico* simulation platform guides the production of vaccine candidates and associated stability testing.

  More information on the [Inno4Vac project](#) website

- **Challenges, objectives, state-of-the-art technologies/technology platform/scientific capabilities Identified by the consortium as needed for the progression of the project:**
  We are aiming for development of a predictive *in silico* vaccine platform. Key to this work is development of *in silico* tools that can supply meaningful outputs regarding the principles governing immune formation. Currently, the biological knowledge needed as background for such work is largely lacking. Thus, we have previously performed *in vivo* experiments to evaluate immune receptor repertoires before and after seasonal influenza vaccination of healthy human volunteers, considering also serological output.

  A challenge is that performance of the needed biological experiments is time consuming and expensive, limiting the number of obtainable data points. Our solution is to perform biological experiments to generate the needed data sets. These data will next be used as basis for generation of *in silico* repertoires, as such enabling training of ML algorithms based on big data.

  The objective for the present call is **to extend our biological datasets to include memory formation in the primary response and activation of memory cells in the re-call response.** To this end, we have collected PBMC before and after a secondary vaccination of our cohort of 30 individuals (one year after the first sample collection). The outcome of the present call should be adaptive immune receptor repertoires from before and after the secondary vaccination of these volunteers.

Timeline: 1 year project

- **Type of technology(ies)/expertise invited in the call:**
  We have collected PBMC from 30 study participants. Call applicants are invited to evaluate the immune receptor repertoire before and after influenza vaccination of this cohort. More specifically, the applicant should sort antigen-specific B- and T-cells from the collected PBMC, generate immune receptor and gene expression libraries, and sequence these. The non-antigen-specific immune receptor repertoire should be evaluated for context. The generated sequence data will first be used for generation of enhanced *in silico* repertoires, and then fed into the existing pipeline for development of *in silico* predictive tools for vaccine efficacy.

- **Contribution to the ongoing activities:**
  We have previously performed *in vivo* experiments to evaluate immune receptor repertoires before and after influenza vaccination for the past season in the 30 selected individuals. The data from the present call will add information on longevity and memory formation to our existing data. Further, evaluations of the updated seasonal vaccine in these individuals will also add information needed for an improved understanding on how repeated exposures to variable viruses can influence immune formation.
  The successful applicant will be integrated into our consortium, and we will have a close dialogue on processing and analyses of the generated data.

- **Details of the proposal preparation and submission process including application form/s and guidelines:**
  All application forms must be completed in English, submitted in PDF format and are not to exceed 15 pages in length including attachments. Applications must be emailed to Tiziana Spadafina (spadafina@sclavo.org), with "Inno4Vac Open Call_Name of Organisation", in the subject line of the email. Your application will be acknowledged within 3 days of receipt.

  Applications must be successfully received by Tiziana Spadafina no later than Friday 23 August 2024. Under no circumstances will the Inno4Vac Management Team accept responsibility for lost emails or consider applications received after the deadline. The proposals will be reviewed by selected members of the Inno4Vac Steering Committee. The selected proposal(s) will be finally validated/ approved. All applicants will be notified via email of the results of their application upon completion of the selection process (2 months after the closure of the call)

- **Contacts:**
    - For scientific reference: ST project leader: Gunnveig Grødeland (Gunnveig.grodeland@medisin.uio.no)
    - For administrative information: SVA contact: Tiziana Spadafina (spadafina@sclavo.org)

- **Submission closing date:** Friday 23 August 2024

- **Selection criteria:**
  Proposals will be assessed according to the following minimum criteria:

    1. **Scientific Excellence**
       - Quality of proposal
       - Credibility of the proposed methodology

2. **Impact of the research (to be included if relevant to the call topic)**
   • The extent to which the outputs of the proposed project would contribute to the expected impact of the Inno4vac work program under the relevant topic.
   • Any substantial impacts not mentioned in the Inno4vac work program that would enhance innovation capacity of the Inno4vac project or create new market opportunities

3. **Quality and efficiency of the implementation**
   • Quality and effectiveness of the work plan, including extent to which the timelines and resources assigned to each task are in line with their objectives and deliverables.
   • Extent to which the proposal brings the necessary expertise

- **Eligibility for funding: applicants must be eligible for funding according to the Article 1 of the Commission Delegated Regulation No 622/2014 of 14 February 2014 Article 10 of H2020 Regulation (EU) No 1290/2013.**

- **The amount of funding or financial contribution to be allocated.**

  Costs are covered up to 250 000 €. The financial contribution can only be used to reimburse eligible costs of the project, in accordance with **article 6 IMI2 Model Grant Agreement.)**

- **Other relevant information (e.g. specific terms in the Consortium Agreement).**
  Key/non-negotiable terms: selected organisations will have to access and to sign the existing Consortium Agreement, without the possibility to change the terms, and will have to sign the Inno4Vac Grant Agreement.