CQDM Connect-Pharma: Pitch Day

Call for Ideas: AI-assisted protein design

CQDM is pleased to launch a call for ideas for our upcoming CQDM Connect-Pharma: Pitch Day.

We are searching for world-class research on AI-assisted protein design to present to domain experts from leading global pharmaceutical organizations on **March 5, 2025.**

Our objective is to bring ground-breaking, innovative Canadian research to CQDM's pharmaceutical members and facilitate interactions between our pharma members and the Canadian ecosystem. Collaborative projects developed with a CQDM pharmaceutical member are eligible to obtain funding via CQDM's Quantum Leap program.

We invite passionate Canadian researchers and visionary teams to submit innovative ideas that have the potential to transform the landscape of medicine and improve patient outcomes.

Scope and Objectives:
*****This call is for AI-assisted <u>protein</u> design and as such submission specific to AI for small molecule design, optimization etc. are out of scope.**

1. **Protein Therapeutic Optimization:** Projects aimed at optimizing therapeutic proteins for increased efficacy, reduced immunogenicity, and enhanced stability.
2. **Antigen Optimization**: Projects aimed at optimizing antigens for increased vaccine efficacy, reflect the appropriate Ag structure, increased immunogenicity, and enhanced stability.
3. **De Novo Protein Design:** AI-driven creation of entirely new proteins with specific therapeutic functions.
   - Specific capabilities of interest could include ideas related to biocatalysis.
4. **AI for Antibody Engineering:** Projects focused on AI methods for designing monoclonal antibodies, bispecific antibodies, or single-domain antibody (sdAb) with improved binding affinity and specificity.
   - Specific capabilities of interest could include ideas related to multiparametric antibody optimization and de novo antibody design
5. **Enzyme Therapeutics:** Designing enzymes for metabolic disorders, rare diseases, or as tools in drug synthesis.
   - Specific capabilities of interest could include ideas related to optimization of catalytic function and prediction of substrate specificity (predicting the substrate potential for a given molecule/protein sequence pair).
6. **Innovative Algorithms**: Projects proposing novel AI methods for protein structure prediction, stability enhancement, or functional optimization.
   - Specific capabilities of interest could include ideas related to protein-protein interaction prediction and protein function prediction (the latter primarily inspired by catalysis).
7. **Multimodal AI Approaches**: Integration of AI with other computational tools like molecular dynamics or quantum chemistry for enhanced protein design
8. **Reverse Vaccinology Approaches:** Projects based on infectious disease convalescents or protected subject's antibody or TCR sequences to design better vaccine antigens

Technical and Methodological Focus:

1. **Data-Driven Insights:** Use of high-quality datasets (e.g., protein-protein interaction data, structural databases, biocatalytic data) to train AI models.
2. **AI Integration with Experimental Workflows:** Proposals combining computational predictions with experimental validation (e.g., high-throughput screening or structural biology techniques).
3. **Improved Predictive Models:** Developing AI tools for predicting protein-small molecule interactions, binding affinities, or therapeutic windows.
4. **Automation in Protein Design:** AI for streamlining iterative design processes, such as directed evolution or rational engineering.
5. **Explainable AI:** Emphasis on interpretability to understand the molecular basis of designed proteins.

Industry and Therapeutic Impact:

1. **Therapeutic Areas:** Projects addressing high-priority diseases like cancer, autoimmune disorders, infectious diseases, or neurodegenerative conditions.
2. **Faster Drug Development:** AI tools to reduce timelines in preclinical development
   - Specific capabilities of interest could include:
     - enhancing protein engineering efficiency**.**
     - reducing the number of iterative protein engineering/directed evolution cycles.
3. **Cost Reduction:** Solutions that lower the costs associated with drug discovery and development, particularly for biologics.

Process: All submitted projects will be shared with CQDM's pharmaceutical members for review and ranking. Top ranked projects will be selected to present to CQDM's global pharmaceutical members at a **CQDM Connect-Pharma: Pitch Day** on **March 5, 2025.**

Who can apply: Canadian academic institutions, biotech companies, and research organizations are eligible to apply. Collaborative projects that involve partnerships between academia and industry are also encouraged. We welcome multidisciplinary teams that can bring diverse expertise to the table.

Deadline and Submission: Submission deadline is **February 5, 2025**, please submit to appliquez-apply@cqdm.org. Detailed guidelines and instructions for proposal submission and the selection form are available on the CQDM website.

For more information visit the CQDM website or contact Simon Fournier (sfournier@cqdm.org).

About CQDM:

CQDM is a non-profit biopharmaceutical research consortium whose mission is to support and facilitate multi-stakeholder collaborative R&D that accelerates translation of leading-edge discoveries into vaccines, therapeutics and diagnostics addressing unmet medical needs while generating significant benefits for the Canadian economy.