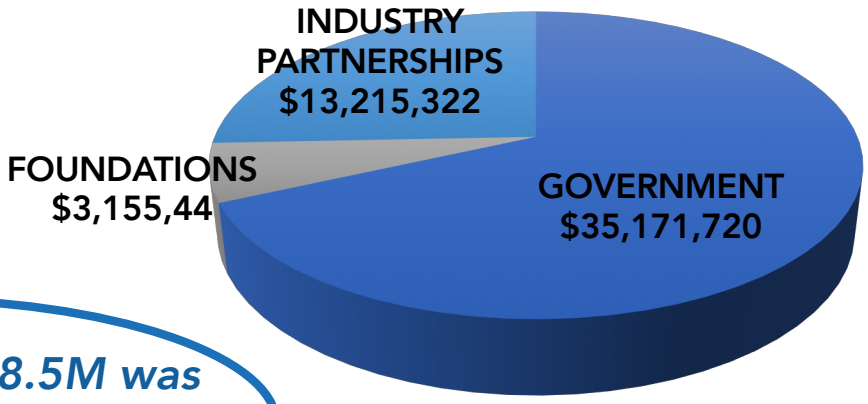
TRAC Toronto Recombinant Antibody Centre

UNIVERSITY OF TORONTO

THE TORONTO RECOMBINANT ANTIBODY CENTRE

10 years of impact in the high throughput generation of high quality synthetic proteins for therapeutic, diagnostic and reagent purposes

FUNDING BY THE NUMBERS



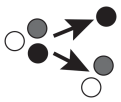
In addition, over $8.5M was brought into the University as overhead funds

10 YEAR TOTAL $51.5M

HIGH THROUGHPUT PIPELINE CAPABILITIES

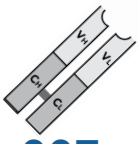
Antibody (Ab) Pipeline

835
unique antigens targeted

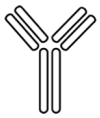


1,420
selection screens carried out

13,071
positive phage clones identified by ELISA

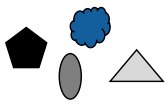


6,007
antibody fragments (Fabs) cloned

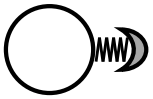


4,418
full length IgGs generated

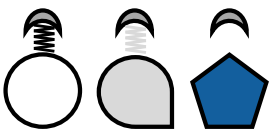
Ubiquitin variant (UbV) Pipeline



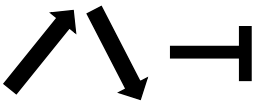
144
ubiquitin-binding protein families targeted



UbV affinity
32% ≤10nM
36% 10nM-100nM
32% >100nM



63%
UbVs show specificity to target



UbV function
86% inhibitors
7% activators
2% activators+inhibitors
5% binders

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DEV SIDHU AND THE TRAC: A DECADE OF IMPACT (2008-2018)

Dr. Sachdev (Dev) Sidhu was recruited to the Donnelly Centre at the University of Toronto in 2008 after ten years as a Senior Scientist at Genentech, during which he acquired significant expertise in the development of phage-displayed synthetic antibody libraries.

At the University of Toronto, with funding from many public agencies including CFI, Genome Canada and ORF, Dev started to put together an automated, high throughput pipeline to enable the generation of synthetic antibodies against virtually any antigen. In 2010, Dev assembled a world-class team made up of some of Ontario's most prominent scientists and clinician-scientists with an unusually broad repertoire of research expertise and biological interests, tools, and reagents, to establish the **Toronto Recombinant Antibody Centre (TRAC)**. Functioning independently within his academic lab, the combination of Dev's staff and trainees research expertise together with TRAC's powerful technologies allowed the Centre to produce thousands of high-quality antibodies and biologics against numerous diverse targets, to be evaluated for therapeutic, diagnostic and research potential.

While the TRAC initially focused on the generation of synthetic proteins using antibody scaffolds, the pipeline has now been applied to engineer other small protein modulators of protein function. Notably, libraries of protein variants built on the ubiquitin scaffold have been successfully used to produce inhibitors and activators of enzymes in the ubiquitin proteasome system. Additional scaffolds are currently being evaluated through the pipeline.

Recognizing the need for a focused mechanism to take his discoveries to the next step towards translation into clinically relevant products with benefits to patients, in 2014 Dev established the **Centre for the Commercialization of Antibodies and Biologics (CCAB)** with a $15M grant from the Canadian Government's NCE program. Additionally, Dev has co-founded several companies to commercialize antibodies and biologics, notably Northern Biologics in Toronto, Pionyr Immunotherapeutics and Reflexion Pharmaceuticals in San Francisco, CA, and Saksin Lifesciences in Chennai, India.

Dev is committed to developing biologics that can benefit patient health in a cost-effective manner, powered by a combination of his academic, discovery work with his drive to translate these discoveries into effective therapeutics.

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MENTORING THE NEXT GENERATION OF SCIENCE LEADERS

82

POSTDOCTORAL FELLOWS & ASSOCIATES

MSc 11 | 7 PhD

GRADUATE STUDENTS

* Plus 7 international grad students hosted

73

UNDERGRADUATE STUDENTS

Alumni have secured positions at:

Guelph University
University of Saskatchewan
Yale University, USA
Goethe University, Germany
Uppsala University, Sweden
Royal Institute of Technology, Sweden
Canadian Nuclear Laboratories
Health Canada
AbCelex Technologies
MedImmune, USA
Sutro Biopharma, USA
LakePharma, USA
Ukko, Israel
DIANA Biotechnologies, Czech Republic

Alumni quotes

"In addition to teaching me how to achieve research excellence in the protein engineering field, Dev showed me how to foster collaborative works that bridge different disciplines involving scientists around the globe, which is critical for the success of all my research projects. This has had a profound impact on how I conduct independent research in my own lab." **Wei Zhang, Assistant Professor at University of Guelph**

"Dev created an environment that allowed me to transition from basic science to translational science in addition to opening my eyes to the quality of industry – still influences me today." **Bryce Nelson, Assistant Professor, Yale Cancer Biology Institute**

"I truly enjoyed the curiosity-driven science and great atmosphere of the Sidhu lab – it was highly inspirational and a game changer for the rest of my career. I also received a strong support from Dev, which allowed me to hit the ground running so that I became a tenured associate professor within 4 years." **Ylva Ivarsson, Associate Professor, Uppsala University**

KNOWLEDGE DISSEMINATION

154

JOURNAL ARTICLES

cited >8700 times

5

BOOKS & CHAPTERS

170

INVITED TALKS

including 11 keynote addresses

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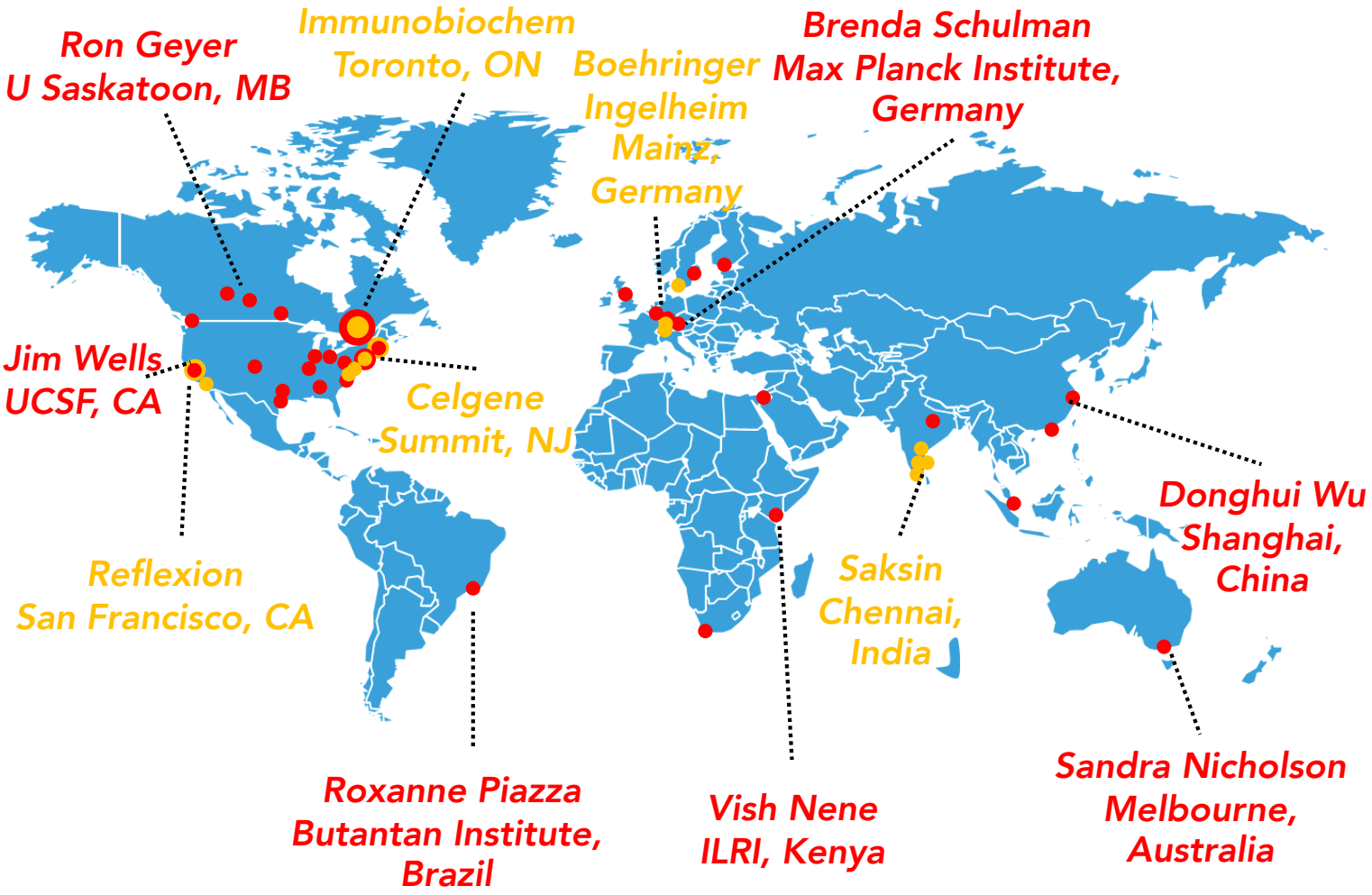
INTERNATIONAL COLLABORATIONS & IMPACT

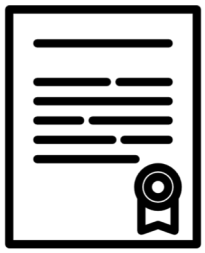
● 120 Academic Collaborations and ● 25 Industrial Collaborations Worldwide



COMMERCIALIZATION SUCCESS

>95

INVENTION DISCLOSURES FILED

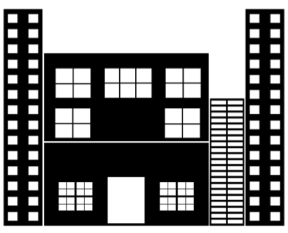


3

PATENTS OBTAINED

33

PATENTS APPLIED FOR



5

COMPANIES CREATED located in Toronto, San Francisco, and Chennai