Discovery-to-Clinic

Clinical-Stage Drug Candidates and Programs Originating from MindWalk Discovery Platforms

MindWalk Holdings Corp. (NASDAQ: HYFT) • May 2026

Formerly ImmunoPrecise Antibodies Ltd.

A Note on Naming

MindWalk Holdings Corp. (NASDAQ: HYFT) was formerly known as ImmunoPrecise Antibodies Inc. (NASDAQ: IPA). All publications, patents, and partner references in this document cite the ImmunoPrecise Antibodies name, which was the company's identity during the period these discovery programs were executed (2001–2025). For clarity, these historical site names are referred to herein as "MindWalk".

MindWalk's role across all programs cited is as the discovery partner. Programs where the Company's role was minor, for example, research-grade optimization and manufacturing are not included. The clinical assets, intellectual property, development decisions, and commercial rights are wholly owned by the partner companies. These case studies demonstrate that antibodies originating from MindWalk's discovery engine have a documented track record of advancing into clinical development. They do not represent a clinical pipeline owned by MindWalk.

Executive Summary

MindWalk operates global antibody discovery sites that have collectively produced over 400 peer-reviewed publications and patents spanning two decades. This publication record documents an underappreciated asset: MindWalk-discovered antibodies are the discovery-stage origin of clinical-stage drug programs and high-value partnerships across publicly traded biotechs, major pharma, private companies, academic medical centers, and disease-focused foundations — programs that are wholly owned and advanced by those partners.

This analysis identifies 20 distinct partner-owned drug candidates and therapeutic programs where MindWalk identified and discovered the candidates. Ten partner programs with direct links to MindWalk-discovered antibodies are in active clinical trials. The remainder span major pharma collaborations (Sanofi Pasteur, Janssen/J&J), foundation-funded research (Michael J Fox Foundation), academic partnerships with clinical trajectories (University of Virginia, MidWestern University), and a diagnostic commercialization partnership (Perseus Science/ChemBio). The OncoResponse immuno-oncology programs (OR502, OR641) represent a notable expansion into the myeloid checkpoint space via IPA's B Cell Select® rabbit antibody platform. In every case, the clinical assets are wholly owned, advanced, and funded by the partner.

In every case, MindWalk discovered the antibody from which the downstream program was built. This places MindWalk at arguably the most critical decision point in drug development — the moment where target engagement is first demonstrated and the molecular series is born.

Discovery-to-Clinic Snapshot — Programs Originating from MindWalk Discovery	
Active partner clinical programs (Phase 1–3)	**10**
Total drug candidates / programs identified	**21+**
Partner companies & institutions	**17+ (public, private, pharma, academic, foundations)**
Major pharma relationships	**Sanofi Pasteur, Janssen/J&J (Crucell)**
MindWalk co-authored publications (PubMed)	**8 papers, 20 unique scientists**

Total publication track record	**400 publications (2001–2025)**

Discovery Partner Clinical Programs

The following discovery programs at biotech and pharma partners were led by MindWalk under the ImmunoPrecise name.

Phase 3: ANX005 — Annexon Biosciences

Target	Complement C1q
Indication	Guillain-Barré Syndrome (GBS)
Clinical Status	Active — GALLOP Phase 3 trial. FDA Breakthrough Therapy designation.

MindWalk discovered lead antibodies 1C7, 2A1, 3A2, 5A3. The clinical lead, ANX005, inhibits the classical complement pathway and has demonstrated significant clinical benefit in GBS patients, earning FDA Breakthrough Therapy designation. ANX005 is wholly owned, developed, and advanced by Annexon Biosciences.

Reference: Anti-complement factor C1Q antibodies and uses thereof (US Patent Application US20190211084) (2019)

Phase 3: ARGX-119 — argenx (NASDAQ: ARGX)

Target	MuSK (muscle-specific kinase)
Indication	Congenital Myasthenic Syndrome (CMS)
Clinical Status	Phase 2/3 planned for 2026. First-in-class MuSK agonist antibody.

argenx selected and humanized ARGX-119 from a panel of anti-MuSK lead antibodies discovered at MindWalk. ARGX-119 a first-in-class agonist antibody that enhances neuromuscular junction signaling. Three publications spanning multiple years document the discovery campaign. ARGX-119 is wholly owned and developed by argenx; MindWalk's contribution was discovery-stage only.

Reference: Patient-specific therapeutic benefit of MuSK agonist antibody ARGX-119 in MuSK myasthenia gravis passive transfer models (Peer-reviewed, iScience) (2024)

Also: ARGX-119 is an agonist antibody for human MuSK that reverses disease relapse (Peer-reviewed, Science Translational Medicine) (2024)

Phase 2: Vudalimab (XmAb20717) — Xencor (NASDAQ: XNCR)

Target	PD-1 × CTLA-4 bispecific
Indication	Metastatic castration-resistant prostate cancer; solid tumors
Clinical Status	Active — Phase 2 ongoing across multiple solid tumor indications.

The anti-PD-1 antibody panel was generated by MindWalk and feeds Xencor's bispecific antibody platform. Vudalimab is the lead clinical asset. The same legacy MindWalk-discovered PD-1 arm is used across multiple Xencor programs (XmAb306, XmAb808, and others). The Xencor clinical programs (vudalimab, XmAb306, XmAb808, and others) are wholly owned by Xencor; MindWalk's contribution was discovery-stage hybridoma generation only.

Reference: Bispecific and monospecific antibodies using novel anti-PD-1 sequences (US Patent Application US20190263909) (2019)

Phase 2: CIT-013 — Citryll BV

Target	Citrullinated histones H2A/H4 (NET formation)
Indication	Rheumatoid arthritis; hidradenitis suppurativa; NET-mediated inflammatory diseases
Clinical Status	Active — Phase 2a RA (NCT06567470), Phase 2a HS (NCT06993233), Phase 2 PET imaging (NCT07147959), Phase 1 SC dosing (NCT07499908).

CIT-013 is a therapeutic anti-citrullinated protein antibody (tACPA) that inhibits neutrophil extracellular trap (NET) formation. The therapeutic inventors also produced the gold-standard anti-CCP diagnostic test for rheumatoid arthritis, at MindWalk. CIT-013 is wholly owned, developed, and advanced by Citryll BV; MindWalk holds no ownership in the asset.

Citryll's preclinical program demonstrated broad efficacy across inflammatory arthritis, pulmonary fibrosis, inflammatory bowel disease, and sepsis models. CIT-013 targets citrulline residues in the N-termini of histones H2A and H4 generated during NET release, suppressing NETosis and promoting NET uptake by macrophages.

Reference: Therapeutic ACPA inhibits NET formation: a potential therapy for neutrophil-mediated inflammatory diseases (Cell Mol Immunol, 2020)

Also: In vivo phage display screening for tumor vascular targets in glioblastoma identifies a llama nanobody against dynactin-1-p150Glued (Oncotarget, 2016)

Phase 1b: PMN310 — ProMIS Neurosciences

Target	Aβ oligomers (misfolded)
Indication	Alzheimer's Disease
Clinical Status	Active — Phase 1b (NCT05948124). Data expected 2026.

Antibodies that selectively bind toxic misfolded protein conformations were discovered under the ImmunoPrecise name. The conformation-selective approach differentiates PMN310 from earlier anti-amyloid antibodies that target all forms of Aβ. PMN310 is wholly owned and developed by ProMIS Neurosciences; MindWalk's contribution was discovery-stage only.

Reference: Rational generation of monoclonal antibodies selective for pathogenic forms of alpha-synuclein (Peer-reviewed, Biomedicines) (2022)

Phase 1: XmAb306 — Xencor (NASDAQ: XNCR)

Target	IL-15/IL-15Rα × PD-1 bispecific
Indication	Solid tumors / Immuno-oncology
Clinical Status	Active — Phase 1 (NCT05275439).

Anti-PD-1 antibodies discovered by MindWalk were incorporated into Xencor's IL-15 cytokine-armed bispecific platform. XmAb306 combines T-cell stimulation with checkpoint blockade in a single molecule.

Reference: Bispecific heterodimeric fusion proteins containing IL-15/IL-15Rα and immune checkpoint antibody fragments (US Patent Application) (2023)

Phase 1: CLN-619 — Cullinan Oncology (NASDAQ: CGEM)

Target	MICA/MICB (NKG2D ligands)
Indication	Solid tumors
Clinical Status	Active — Phase 1 (NCT05615493).

The anti-MICA/MICB antibody panel was discovered and generated by MindWalk. Cullinan acquired Novelogics to develop CLN-619, which stabilizes NKG2D ligands on tumor cells to enhance natural killer cell killing. CLN-619 is wholly owned by Cullinan Oncology; MindWalk's contribution was discovery-stage antibody work only.

Reference: Antibodies to MICA and MICB proteins (US Patent Application US20190248901) (2019)

Phase 1: XmAb808 — Xencor (NASDAQ: XNCR)

Target	PD-L1 × CD28 bispecific
Indication	Solid tumors
Clinical Status	Active — Phase 1.

MindWalk discovered the antibody used in Xencor's CD28 co-stimulatory bispecific, combining checkpoint modulation with T-cell co-stimulation.

Reference: Bispecific antibodies that bind PD-L1 and CD28 (US Patent Application US20220135684) (2022)

Phase 1/2: OR502 — OncoResponse

Target	LILRB2 (ILT4)

Indication	Advanced solid tumors (immuno-oncology)
Clinical Status	Active — Phase 1/2 clinical trial. Phase 1 data (SITC 2024) showed 65% disease control rate (2 PR + 9 SD, N=17).

OR502 is a humanized IgG1 antibody targeting LILRB2 (ILT4), an inhibitory receptor on immunosuppressive myeloid cells. The parental rabbit monoclonal antibody was generated using ImmunoPrecise's proprietary B Cell Select® platform. OR502 blocks LILRB2 interaction with HLA class I ligands, relieving myeloid-mediated immune suppression and enhancing both innate and adaptive anti-tumor immunity. Preclinical data demonstrated best-in-class activity versus benchmark anti-LILRB2 antibodies, including superior enhancement of IFNγ production and T-cell function. OR502 significantly enhanced the activity of pembrolizumab in combination studies. OR502 is wholly owned, developed, and advanced by OncoResponse; MindWalk's contribution was discovery-stage rabbit B cell antibody generation only.

Reference: OR502, a best-in-class anti-LILRB2 antibody that enhances both innate and adaptive anti-tumor immune responses (SITC 2023, JITC) (2023)

Preclinical: OR641 — OncoResponse

Target	LILRB1 × LILRB2 (dual antagonist)
Indication	Solid tumors (immuno-oncology)
Clinical Status	IND-enabling studies. Cell line development completed.

OR641 is a humanized dual antagonist antibody derived from rabbit B cells immunized with LILRB2 protein, generated using ImmunoPrecise's B Cell Select® platform. OR641 binds both LILRB1 (ILT2) and LILRB2 (ILT4), blocking their interactions with HLA class I ligands. Dual antagonism restores both innate and adaptive immune responses — a strategy to enhance checkpoint inhibitor efficacy. OR641 demonstrated best-in-class activity: promoting Th1-like innate immunity, enhancing macrophage phagocytosis of HLA-G+ tumor cells, rescuing NK cell cytotoxicity, and restoring exhausted T-cell function. Half-life of 10 days in humanized FcRn mice. OR641 is wholly owned by OncoResponse; MindWalk's contribution was discovery-stage only.

Reference: OR641, a novel dual antagonist antibody targeting LILRB1 and LILRB2 that promotes a Th1-like immune response (SITC 2023, JITC) (2023)

Phase 1 (Disc.): LAVA-1207 — Lava Therapeutics

Target	Vδ2-TCR × tumor targets
Indication	Metastatic castration-resistant prostate cancer
Clinical Status	Discontinued December 2024 — Lava restructured.

MindWalk provided VHH and protein expression support for Lava's γδ T-cell engager platform. LAVA-1207 was the lead program. LAVA-1207 was wholly owned by Lava Therapeutics; MindWalk's contribution was discovery- and expression-stage support only.

Reference: Vδ2 T-cell engagers bivalent for Vδ2-TCR binding provide anti-tumor immunity (Peer-reviewed, iScience) (2024)

Major Pharma & Foundation Non-Therapeutic Biologics Programs

Beyond the clinical-stage biotech partnerships, MindWalk's publication record documents discovery work for major pharmaceutical companies, foundations, and diagnostics firms. These relationships signal the platform's credibility and breadth.

Sanofi Pasteur — Vaccine Development

Partner	Sanofi Pasteur Ltd. (Canada)
Program	Immunogenic polypeptides and monoclonal antibodies
Discovery Method	Hybridoma (MindWalk Canada)
Significance	Discovery collaboration with one of the world's largest vaccine manufacturers

MindWalk generated antibodies for Sanofi Pasteur's vaccine research program, documented in a jointly cited patent. Sanofi Pasteur is among the most selective buyers of external discovery capability in the vaccine space.

Patent: Immunogenic polypeptides and monoclonal antibodies (Canadian Patent CA2694466) (2019)

Janssen Vaccines (Johnson & Johnson) — Vaccine Analytics

Partner	Janssen Vaccines & Prevention (Crucell), a J&J subsidiary
Program	Capillary electrophoresis applications for viral vaccine analysis
Significance	Analytical support for J&J's vaccine platform using MindWalk-generated antibodies

MindWalk-generated hybridoma antibodies were used in Janssen's vaccine quality control analytics, supporting 16 distinct capillary electrophoresis applications. This illustrates how IPA antibodies become embedded in a major pharma partner's analytical workflow.

Peer-reviewed: Sixteen capillary electrophoresis applications for viral vaccine analysis (Electrophoresis) (2022)

Michael J. Fox Foundation — Parkinson's Disease Research Tools

Partner	The Michael J. Fox Foundation for Parkinson's Research
Program	Phospho-ubiquitin (p-S65-Ub) antibodies for PINK1-PRKN signaling
Clinical Relevance	PINK1/PRKN pathway now targeted by AbbVie (ABBV-1088, Phase 1) and Mission Therapeutics (MTX325, Phase 1)

MindWalk co-authored this work. The MindWalk-discovered phospho-ubiquitin antibodies are enabling tools for one of the most active areas in Parkinson's drug development. Multiple clinical programs (AbbVie's ABBV-1088, Mission Therapeutics' MTX325) now target the PINK1/PRKN mitophagy pathway that these antibodies monitor.

Peer-reviewed: Development and characterization of phospho-ubiquitin antibodies to monitor PINK1-PRKN signaling in cells and tissue (Autophagy) (2024)

Perseus Science / ChemBio — Point-of-Care TBI Diagnostic

Partner	Perseus Science Group LLC (formerly ChemBio Diagnostics)
Program	PKC-gamma blood biomarker for traumatic brain injury / concussion
Status	Development partnership for point-of-care concussion test. FDA pathway.

MindWalk generated the rabbit B cell-derived antibodies targeting PKC-gamma, a CNS injury biomarker. Perseus Science partnered with ChemBio Diagnostics to develop a rapid point-of-care concussion test using MindWalk-derived antibodies on ChemBio's DPP diagnostic platform. The combination of a patented biomarker with IPA-generated antibodies in a commercial diagnostic illustrates additional value creation experience in the diagnostic field.

Patent: In vitro method for diagnosing central nervous system injury (US Patent 11,360,101) (2022)

Academic & Preclinical Programs

The following programs are at earlier stages but demonstrate MindWalk's reach into novel therapeutic targets and academic medical centers.

Program	Partner	Target	Indication	Note
Anti-SAS1B ADC	University of Virginia	SAS1B (cancer-oocyte antigen)	Pancreatic cancer, uterine tumors	ADC shown to kill cancer cells at 0.01–0.1 µg/mL. SAS1B expressed in 68% of pancreatic cancers. IPA scientist Andra Li co-authored.
Anti-ASPH mAb / ADC	MidWestern University	Aspartyl β-hydroxylase (ASPH)	Pancreatic, liver, biliary cancer	ASPH is a validated cancer target. ADC and small molecule approaches in preclinical development.
Anti-TDP-43 mAb	UBC / ProMIS Neurosciences	TDP-43 (misfolded)	ALS / Frontotemporal Dementia	Conformation-selective antibodies for misfolded TDP-43. Relevant to MindWalk's own TDP-43 pipeline interest.
Anti-CLPTM1	Genagon Therapeutics (Sweden)	CLPTM1 (novel tumor antigen)	Oncology (solid tumors)	Novel target discovered by Genagon. MindWalk generated the hybridoma panel.
Artenga MDC	Artenga Inc.	AAV2 capsid (microbubble conjugate)	CNS disorders (BBB crossing)	Antibodies for microbubble drug conjugate platform enabling blood-brain barrier penetration.
SerpinX AAT variant	SerpinX	α1-Antitrypsin (engineered serpin)	α1-Antitrypsin Deficiency (AATD)	AATD is a hot therapeutic area — BEAM-302 (Beam), CTX460 (CRISPR Tx) and others now entering Phase 1.
IDEXX Veterinary Dx	IDEXX Laboratories (NASDAQ: IDXX)	Clusterin isoforms; tapeworm antigens	Veterinary diagnostics	Repeat commercial client. IDEXX has ~$40B market cap. Two separate IPA discovery campaigns documented.

References — Academic & Preclinical Programs

Anti-SAS1B ADC: View publication / patent
Anti-ASPH mAb / ADC: View publication / patent
Anti-TDP-43 mAb: View publication / patent
Anti-CLPTM1: View publication / patent
Artenga MDC: View publication / patent
SerpinX AAT variant: View publication / patent
IDEXX Veterinary Dx: View publication / patent

Co-Authored Publications

Beyond fee-for-service work, MindWalk scientists are named co-authors on peer-reviewed publications — a meaningful signal that the company's contribution extends into genuine scientific collaboration. A PubMed affiliation search for "ImmunoPrecise" — the legacy name under which these papers were published — returns 13 publications with 23 unique MindWalk scientists as co-authors. An additional 5 publications carry ModiQuest B.V. (Oss) affiliations, connecting the legacy Netherlands antibody operations to the current MindWalk scientific network.

The standout is the 2024 SARS-CoV-2 multi-antibody paper in Biomedicines, where 21 of approximately 30 authors carry an ImmunoPrecise affiliation. This is company-led science, not a service acknowledgment. The ModiQuest papers feature Renato Chirivi and the late Jos Raats (formerly of MindWalk), whose tACPA work became CIT-013 (now in Phase 2).

Broad Epitope Coverage of Therapeutic Multi-Antibody Combinations Targeting SARS-CoV-2
Biomedicines (2024) • 21 IPA co-authors (Roodink, van Erp, Li, et al.)

Development and characterization of phospho-ubiquitin antibodies to monitor PINK1-PRKN signaling
Autophagy (2024) • Karima Pirani

Intratumoral injection of IL-12-encoding mRNA targeted to CSF1R and PD-L1
Mol. Therapy — Nucleic Acids (2023) • Sander M J van Duijnhoven

Shortened Hinge Design of Fab × sdAb-Fc Bispecific Antibodies Enhances Redirected T-Cell Killing
Biomolecules (2022) • Sander M J van Duijnhoven

Monoclonal antibody 7H2.2 binds the C-terminus of the cancer-oocyte antigen SAS1B
Acta Crystallographica D (2022) • Andra Li

Metformin alters H2A.Z dynamics and regulates androgen dependent prostate cancer progression
Oncotarget (2019) • Deanna Dryhurst

A Novel Sensitive Immunoassay Targeting 5-Methylthio-d-Xylofuranose-Lipoarabinomannan (TB diagnostics)
J. Clinical Microbiology (2018) • Andra Li

Engineering Elastin-Like Peptide-Based Nanoparticles displaying VHH for SARS-CoV-2 Neutralization
Biomacromolecules (2025) • Ilse Roodink

Therapeutic ACPA inhibits NET formation: a potential therapy for neutrophil-mediated inflammatory diseases
Cell. Mol. Immunol. (2020) • Renato Chirivi, Jos Raats [ModiQuest/CitrylI]

Recombinant antibody against Trypanosoma cruzi from Chagas heart disease patients recognizes mammalian nervous system
EBioMedicine (2021) • Renato Chirivi, Jos Raats [ModiQuest]

Humanization of Murine Monoclonal anti-hTNF Antibody: The F10 Story
Molekuliarnaia Biologiia (2017) • Jos Raats, Renato Chirivi [ModiQuest]

In vivo phage display screening for tumor vascular targets in glioblastoma identifies a llama nanobody
Oncotarget (2016) • Ilse Roodink, Jos Raats [ModiQuest]

Control of organization and function of muscle and tendon by thrombospondin-4
Matrix Biology (2014) • Guido Jenniskens [ModiQuest Research BV]

Note: *IPA co-authorships are indexed under the ImmunoPrecise Antibodies affiliation in PubMed. These same scientists now operate under the MindWalk name. ModiQuest B.V. publications are indexed under the ModiQuest affiliation; these scientists operated from the Oss, Netherlands facility.*

Analytical Observations

This expanded analysis surfaces several points relevant to MindWalk's investment profile:

Embedded partner relationships from the IPA era carry forward. Xencor alone accounts for four distinct clinical-stage programs derived from a single hybridoma campaign. argenx funded three publications documenting the ARGX-119 discovery. These are multi-year scientific partnerships that persist through the name change.

Major pharma and foundation clients validate the platform. Sanofi Pasteur, Janssen/J&J, and the Michael J. Fox Foundation chose MindWalk for discovery work. These are sophisticated buyers who evaluated competing platforms. The PINK1/PRKN antibodies for Michael J. Fox Foundation now enable research in a therapeutic area attracting Phase 1 investments from AbbVie and Mission Therapeutics.

Revenue streams extend beyond therapeutics. The Perseus/ChemBio TBI diagnostic and IDEXX veterinary programs demonstrate MindWalk-derived antibodies generating value in diagnostics and animal health — commercial channels with different risk profiles than drug development.

Scientific credibility is documented and searchable. Twenty named co-authors across 8 peer-reviewed PubMed-indexed publications represent a team that publishes, collaborates at a scientific level, and generates intellectual property. These are findable under the ImmunoPrecise affiliation.

Methodology

This report was compiled from: (1) a systematic review of MindWalk's 400-publication internal tracker spanning 2001–2025 (published under the ImmunoPrecise and ModiQuest names); (2) PubMed affiliation searches for "ImmunoPrecise" to identify co-authored publications; (3) ClinicalTrials.gov, company press releases, SEC filings, and patent databases for current clinical status; (4) web research for partner company pipelines, FDA designations, and trial updates; and (5) filtering for discovery-only contributions, *excluding* manufacturing and protein expression work where IPA's role was purely production.

Clinical phase assignments reflect publicly available information as of April 2026. Trial statuses may change. This document does not constitute investment advice.

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