

Myelin the Gap | Initiating Coverage of Quantum BioPharma (BUY, PT \$8)

We are initiating coverage of Quantum BioPharma with a BUY rating and \$8 price target based on LUCID-MS, a potentially first-in-class non-immunomodulatory small molecule positioned to address neurodegeneration and disability progression in progressive multiple sclerosis, where therapeutic options remain limited.

LUCID-MS, also known as **Lucid-21-302**, is an oral, non-covalent protein arginine deiminase 2 (PAD2) inhibitor designed to inhibit citrullination of myelin proteins, including myelin basic protein (MBP). Hypercitrullination is implicated in myelin instability, demyelination, and MS pathology. Unlike approved immune-directed MS therapies, LUCID-MS has a non-immunomodulatory mechanism intended to preserve myelin integrity and neuronal function. The program therefore offers a differentiated myelin-protection hypothesis focused on disability accumulation rather than relapse reduction alone. The valuation captures little of the option value embedded in LUCID-MS: Quantum BioPharma trades at roughly \$3.08 per share and a market capitalization near \$25 million, backed by \$3.65 million in cash and cash equivalents, with combined cash, cash equivalents, and digital assets of approximately \$9.5 million as of June 30, 2026.

The clinical case remains early but encouraging. LUCID-MS completed Phase 1 single-ascending-dose and multiple-ascending-dose studies enrolling 40 healthy volunteers in aggregate. In the MAD study, participants received oral LUCID-MS at 150 mg or 300 mg once daily for seven days. No serious adverse events or study-drug-related treatment-emergent adverse events were reported. Drug exposure was dose proportional across the 150 mg and 300 mg cohorts, with no significant accumulation during repeat dosing. At 300 mg, human exposure was comparable with exposure in the EAE mouse efficacy model, while remaining well below rat and dog no-observed-adverse-effect-level exposures.

On August 10, 2026, the company announced that the FDA had cleared its IND, authorizing a randomized, double-blind, placebo-controlled Phase 2 trial of LUCID-MS in progressive MS. The IND-related regulatory gating item has been resolved, shifting the next value inflection to Phase 2 execution: trial initiation, patient enrollment, protocol disclosure, and the first patient-derived evidence of whether PAD2 inhibition may influence neurodegeneration or disability-relevant outcomes.

The company also holds a smaller, commercial optionality asset in unbuzzd, a licensed alcohol recovery consumer product for which Quantum retains a 19.48% ownership interest and a 7% royalty on sales until cumulative royalty payments reach \$250 million, followed by a 3% royalty in perpetuity. Quantum also retains full rights to develop similar or alternative formulations for pharmaceutical and medical uses. These assets are not core to the thesis: Royalty revenue recognized to date is negligible, leaving unbuzzd as contingent optionality rather than a near-term contributor.

Valuation: Our \$8 price target is based on a sum-of-the-parts DCF valuing LUCID-MS, unbuzzd, net cash, investments, and digital assets. The model applies probability-adjusted LUCID-MS revenue, a 25% execution haircut, and fully diluted shares to derive intrinsic value of approximately \$7.94 per share, rounded to \$8.

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Stock Data

Rating	Buy
Price Target	\$8.00
Exchange	NASDAQ
Price	\$3.08
52-Week High	\$21.00
52-Week Low	\$2.07
Market Cap (M)	\$25
Shares Outstanding (M)	6
3 Month Avg Volume	303,555

One Year Performance Chart



Why Immune Control Has Not Solved Progressive MS

Multiple sclerosis therapeutics have spent three decades pursuing immune-directed approaches, including interferons, sphingosine-1-phosphate modulators, and anti-CD20 antibodies. These therapies have meaningfully reduced relapse rates and inflammatory disease activity, while several have demonstrated benefits in slowing disability progression in selected patient populations. Their limitation is that immune control has not eliminated the slow, cumulative disability progression that can define later-stage disease, particularly once chronic demyelination, axonal injury, failed repair, and neurodegeneration become more prominent.

MS is a chronic CNS disease that involves inflammation, demyelination, and neurodegeneration. Myelin is the insulating sheath around axons that supports rapid and energy-efficient neural signaling through saltatory conduction. When myelin is damaged, signal conduction can slow or fail, contributing to the visual, sensory, motor, coordination, fatigue, and cognitive symptoms experienced by patients. The disease course also changes over time: RRMS is characterized by relapses and remissions, SPMS reflects gradual worsening after an initial relapsing course, and PPMS is defined by progression from onset without distinct relapses and remissions. This biology leaves room for therapeutic strategies that complement immune-directed DMTs by targeting myelin injury, failed repair, and neuroaxonal degeneration. LUCID-MS enters this landscape from a differentiated mechanistic angle. This positioning underpins the investment thesis, although clinical validation in patients remains the critical outstanding question.

LUCID-MS's non-immunomodulatory mechanism opens a commercially important possibility: the therapy could be layered onto existing disease-modifying treatments as an add-on rather than forcing physicians to choose between competing first-line options. That combinability, if borne out in later trials, would meaningfully expand the addressable prescribing population beyond patients who have failed or are dissatisfied with current treatment. This remains an opportunity rather than an established product attribute, since Phase 2 must first demonstrate acceptable patient safety and a credible efficacy signal. Quantum BioPharma also secured exclusive worldwide patent rights to the LUCID-MS new chemical entity for MS and other demyelinating diseases, subject to the underlying license agreement, including its development, regulatory, and commercial milestone obligations.

The company's near-term trajectory now hinges on successful Phase 2 activation and enrollment following FDA clearance of the IND on August 10, 2026. Based on management's current planning assumptions, first-site activation could occur in February 2027, followed by first-patient enrollment in March 2027. Management currently anticipates completion of enrollment around February 2028, a potential interim analysis in 2Q28 to 3Q28, and topline data around December 2029. These timing estimates remain preliminary and subject to final protocol design, site activation, enrollment performance, regulatory interactions, available financing, and other execution variables. Because Phase 1 provided an initial short-duration safety and pharmacokinetic profile, including no serious or study-drug-related adverse events in the seven-day MAD study, Phase 2 must still establish tolerability during longer exposure in patients with progressive MS and any concomitant therapies permitted by the protocol. Management expects the study to include progressive-MS patients, potentially spanning PPMS and SPMS. Enrollment parameters remain subject to the final protocol, though management has indicated that documented objective disability progression could be a central criterion. MRI, NfL, and GFAP may be assessed longitudinally as measures of treatment response rather than selection criteria. The central question is whether the myelin-protective signal seen in animal models translates into measurable clinical benefit in humans. The clinical trial design, patient population, treatment duration, dose selection, background DMT use, and endpoint hierarchy will determine whether the Phase 2 readout can answer that question credibly.

The thesis for clinical-stage biotech companies often collapse under financing pressure well before data reads out, and Quantum BioPharma has taken steps to reduce that risk. Total operating expenses declined 53% year over year to \$2.29 million in 2Q26, while cash used in operating activities fell 44% to \$3.46 million in 1H26. Management currently estimates an all-in Phase 2 cost of approximately \$15 million. The company expects that additional capital may be required ahead of topline data, potentially through equity issuance and ATM utilization. These financing plans remain subject to capital-market conditions, the timing and cost of Phase 2 execution, and the availability of alternative funding sources.

Taken together, the combination of a mechanistically differentiated, patent-protected asset entering its defining efficacy test, improved near-term liquidity, a preliminary but increasingly visible Phase 2 execution path, and a market opportunity the Pipeline Deep Dive quantifies in detail below supports the foundation for a constructive view on Quantum BioPharma as the program advances into its first patient-based efficacy study.

LUCID-MS: Charting a Path to Market Leadership in Myelin Protection

LUCID-MS, known in preclinical literature as Lucid-21-302 and KP-302, represents Quantum BioPharma's lead clinical-stage asset and the centerpiece of its investment case. The compound targets multiple sclerosis through a mechanism distinct from the immune-modulating therapies that define current standard of care, following more than 14 years of preclinical research led by Dr. Lakshmi Kotra's team at Toronto's University Health Network. The program is now supported by an FDA-cleared IND for Phase 2 in progressive MS, placing the next stage of value creation on patient-level translation of the PAD2-inhibition hypothesis.

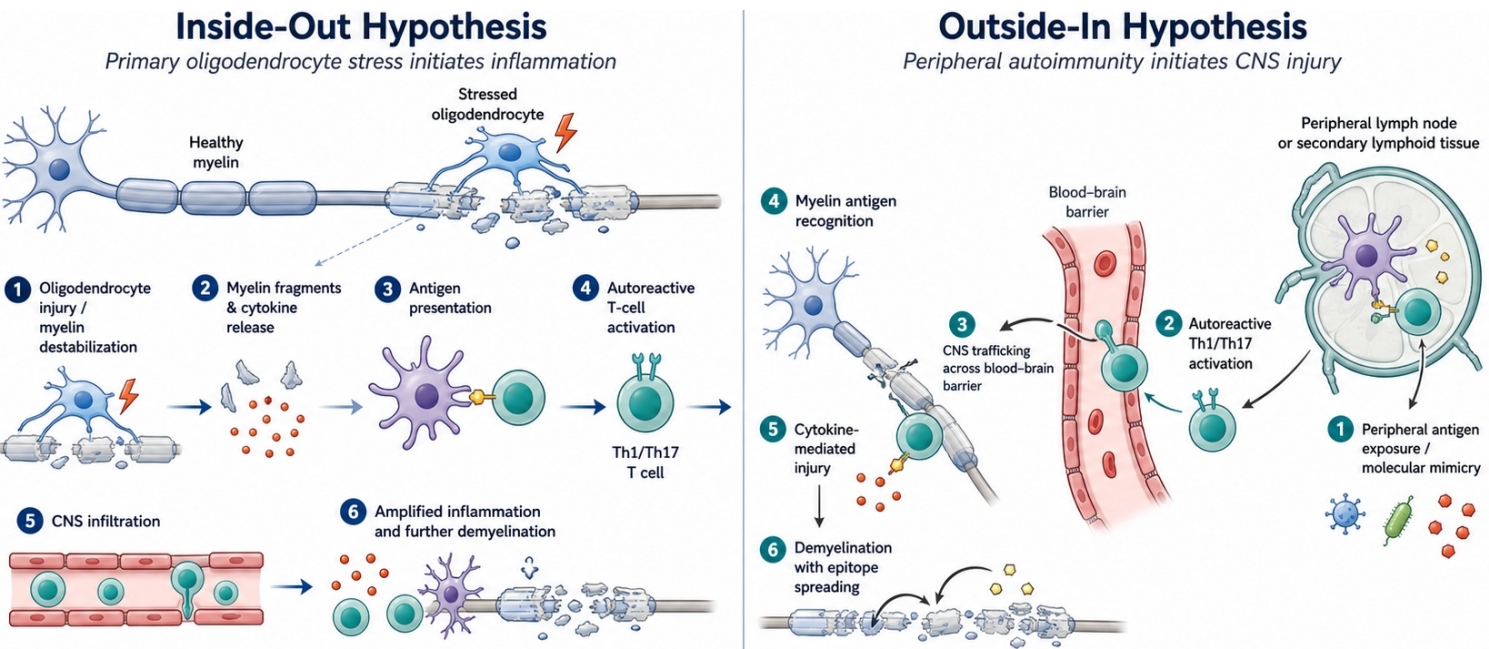
*IND accepted August 10, 2026

	Discovery	Lead	In vivo PoC	IND* enabling studies	P1	P2	P3	Market Launch
LUCID-MS (Multiple Sclerosis)					Phase 1 SAD/MAD Completed	IND Phase 2 filed in Q2 2026		

Source: QNTM July 2026 Corporate Presentation

Multiple sclerosis is a chronic disease of the central nervous system characterized by damage to myelin, the fatty sheath that insulates nerve fibers and enables rapid transmission of electrical signals between the brain and the rest of the body. When myelin breaks down, nerve signaling slows or fails altogether, producing the vision loss, fatigue, impaired coordination, and progressive disability that define the patient experience. Current MS therapeutics have largely been developed to reduce inflammatory activity through immune modulation, which remains central to care in relapsing disease. The disease is nevertheless heterogeneous, with variable contributions from inflammation, demyelination, remyelination failure, axonal injury, and neurodegeneration across patients and disease stages. This clinical heterogeneity is particularly relevant in progressive disease, where disability can accumulate with limited relapse activity, including progression independent of relapse activity. The outside-in paradigm emphasizes primary peripheral immune dysregulation and CNS-directed autoimmunity, whereas the inside-out paradigm proposes that primary degeneration of the myelinating unit generates antigenic debris and a secondary autoimmune overlay. These concepts remain complementary, potentially overlapping models of MS pathobiology (see Figure 1).

Figure 1 - Complementary Models of Multiple Sclerosis Pathobiology: Outside-In Autoimmunity and Inside-Out Myelin Degeneration



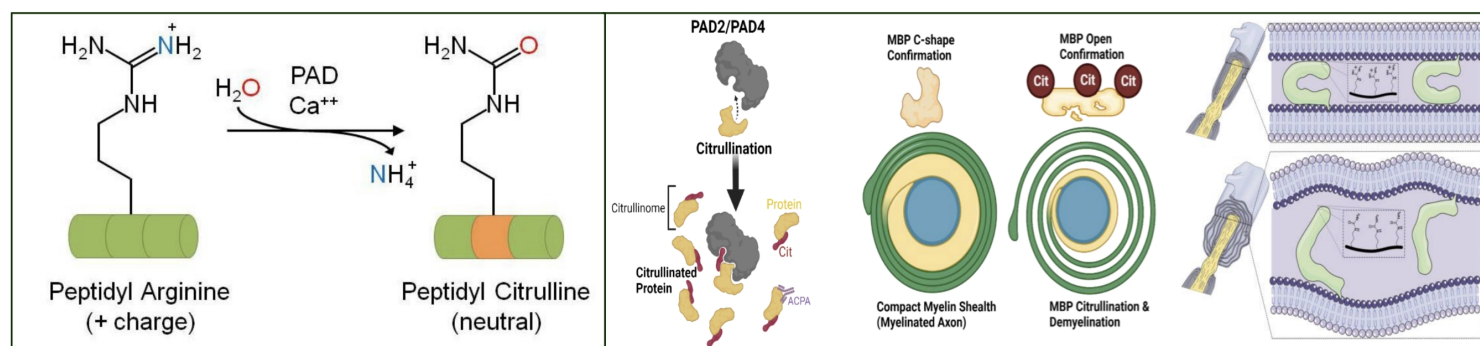
Source: Generated by Rodman & Renshaw

The persistence of disability progression despite control of inflammatory activity has motivated research into mechanisms that may directly affect myelin integrity and neuroaxonal preservation. Researchers at the University of Calgary and University of Toronto, whose work underpins LUCID-MS, have proposed an alternative or complementary explanation, sometimes described as "inside out" pathology, in which subtle biochemical damage to myelin itself occurs first and secondarily triggers the immune response, rather than immune attack being the primary event. The contemporary view is more appropriately described as an interaction between chronic neurodegeneration and variable autoimmune inflammation, rather than a binary choice between the two paradigms. In an experimental model built to test this hypothesis, researchers found that a brief, controlled chemical alteration to myelin, followed by an immune stimulus, produced lesions of inflammatory demyelination with radiological and histological features relevant to active MS lesions, including blood-brain barrier breakdown, T-cell infiltration and axonal loss, while immune stimulation without the preceding myelin change produced no such damage. These data support the hypothesis that biochemical alteration of myelin can contribute to inflammatory demyelination. However, this sequence does not prove that biochemical alteration of myelin initiates human MS, although it may provide a mechanistic basis for testing myelin-directed interventions.

The scientific rationale behind LUCID-MS begins with a specific pathological observation in MS patients: myelin basic protein, a structural component of the myelin sheath, undergoes a post-translational modification called hypercitrullination. This process converts peptidyl-arginine residues into peptidyl-citrulline (see Figure 2, left panel), a chemical change that destabilizes myelin structurally and generates new antigenic neopeptides that may contribute to immune recognition and inflammatory pathology. Citrullination is therefore the biochemical event that connects the company's myelin-protection thesis with a pharmacologically addressable target.

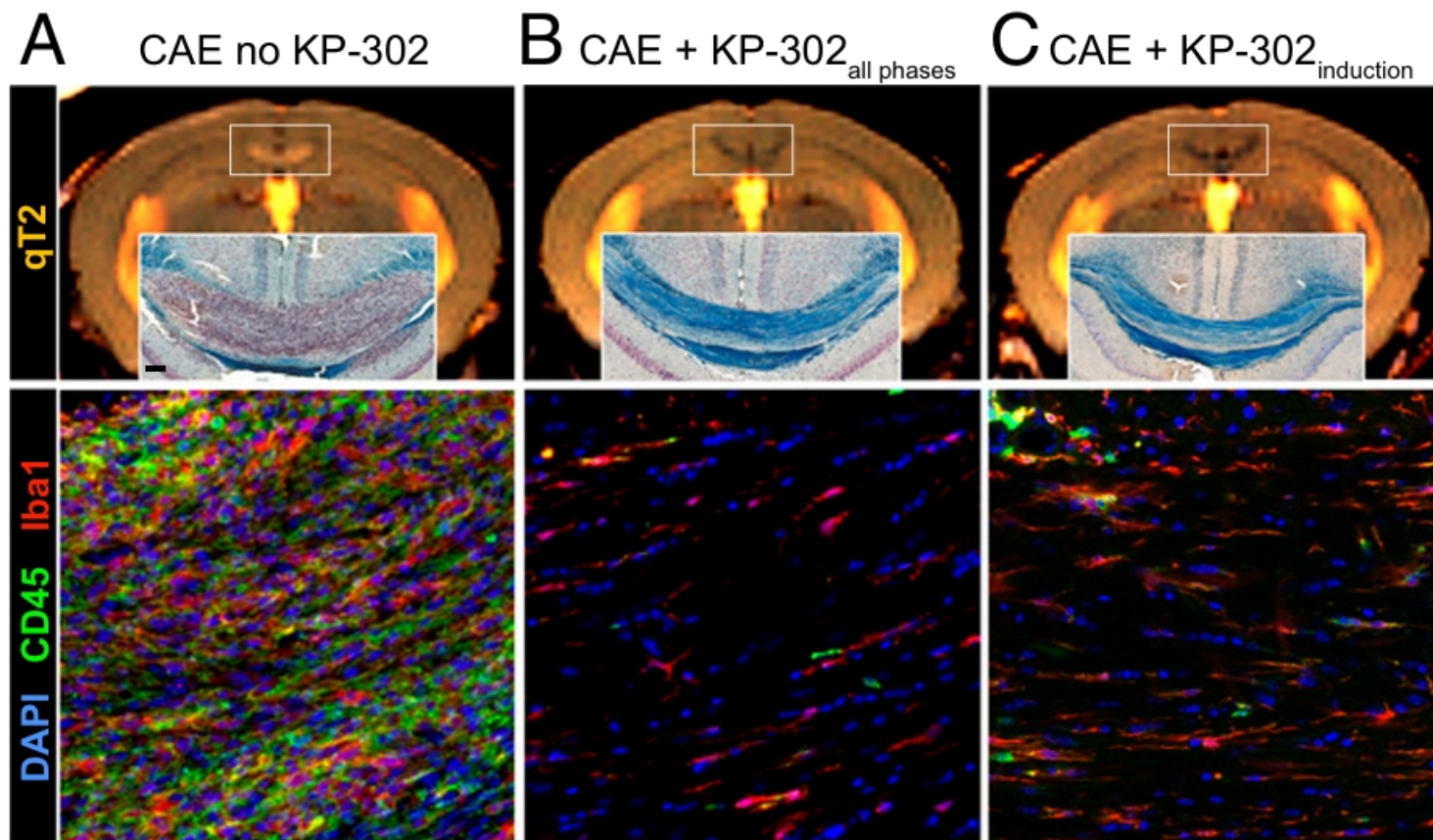
Protein arginine deiminase 2 (PAD2) is an enzyme expressed in the central nervous system and catalyzes this citrullination process. Research has shown that myelin citrullination is increased in MS tissue and may contribute to lesion biology. LUCID-MS functions as a non-covalent inhibitor of this enzyme, interrupting the biochemical cascade associated with myelin destabilization rather than suppressing the broader immune response that current disease-modifying therapies target. This distinction matters clinically because LUCID-MS has a non-immunomodulatory mechanism and could support a complementary treatment role if its efficacy and safety are validated in patients. The treatment proposition is not that PAD2 inhibition has already been shown to repair myelin in humans, rather it is that limiting PAD2-mediated citrullination could reduce one contributor to myelin instability and secondary inflammatory pathology. Quantum's proposed mechanism links increased citrullination of myelin proteins with myelin destabilization and antigenic neopeptide formation (see Figure 2, right panel).

Figure 2 - PAD2-Mediated Citrullination May Destabilize Myelin in Multiple Sclerosis



Source: Adapted from ACTRIMS 2026 Poster

The preclinical evidence supporting this mechanism spans two independent animal models of MS, testing the compound in complementary immune-driven and myelinopathy-driven systems. In experimental autoimmune encephalomyelitis, a widely used model of autoimmune-driven demyelination, Lucid-21-302, reported in the original publication as KP-302 or compound 23, improved functional and histologic measures. In the cuprizone autoimmune encephalitis model, which pairs a controlled myelin alteration with subsequent immune stimulation, KP-302 reduced radiologic and histologic evidence of inflammatory demyelination when administered during the myelin-alteration phase (see Figure 3). Protection was observed when treatment was limited to the initial cuprizone induction phase, supporting the hypothesis that PAD-mediated citrullination contributes upstream of downstream inflammatory pathology in this model. Across both studies, treatment was associated with improved functional recovery, preserved myelin integrity, and reduced axonal degeneration. EAE and CAE do not fully recapitulate progressive MS in humans.

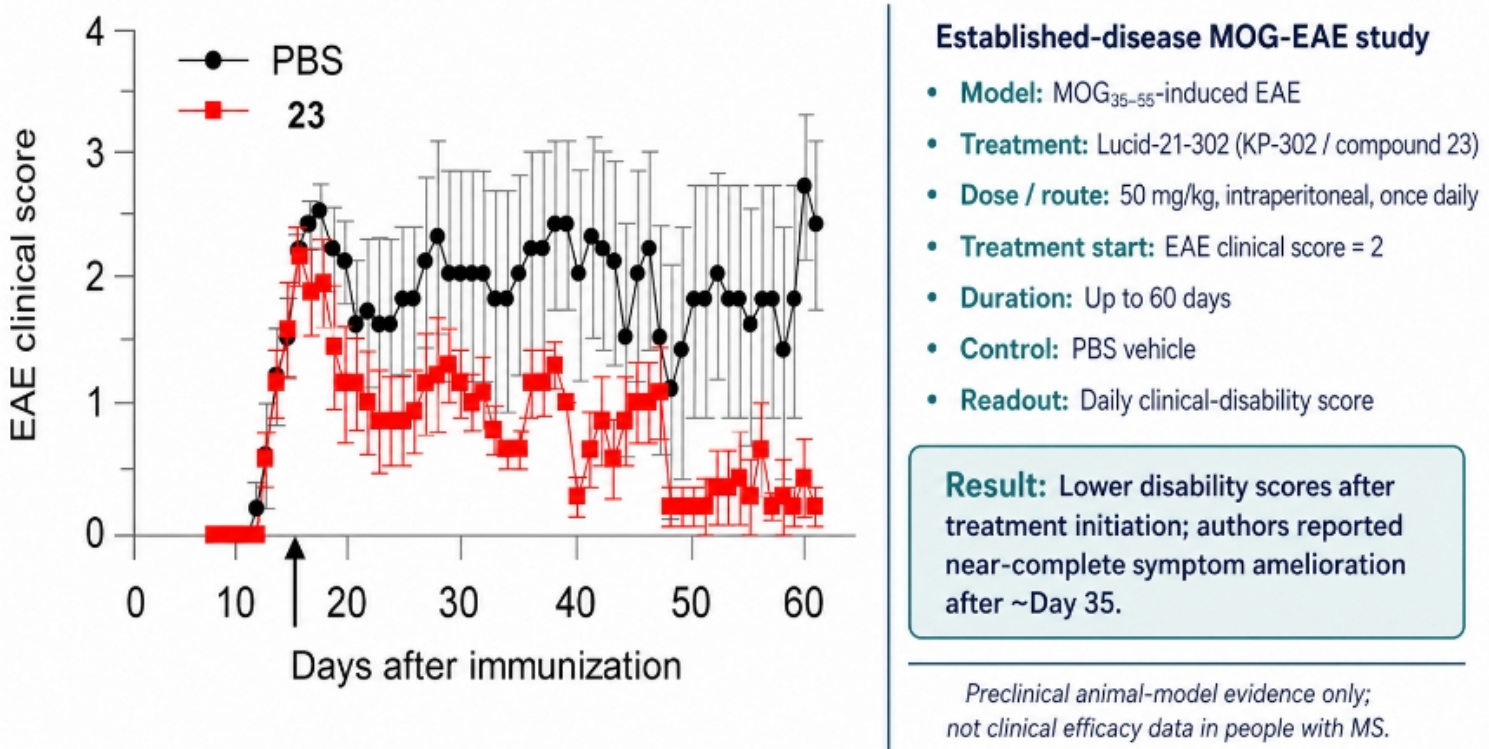
Figure 3 - *PAD Inhibition During Myelin Alteration Mitigates Inflammatory Demyelination in the CAE Model.*

Source: Adapted from Caprariello et al., PNAS 2018, Figure 3A–C.

The preclinical package also generated a functional efficacy signal in MOG-EAE, an immune-mediated model of CNS inflammation and demyelination. Daily intraperitoneal Lucid-21-302, reported in the original publication as KP-302 or compound 23, was initiated at 50 mg/kg after mice reached established disease, defined as an EAE clinical score of 2. Treated mice subsequently showed lower clinical-disability scores than PBS controls through the 60-day study, while body-weight trajectories did not differ between groups (see Figure 4). This functional result complements the pathology-focused CAE findings, although it remains animal-model evidence and does not establish efficacy, remyelination, or clinical benefit in individuals with progressive MS.

Figure 4 - LUCID-MS Improved Clinical Disability in Established MOG-EAE

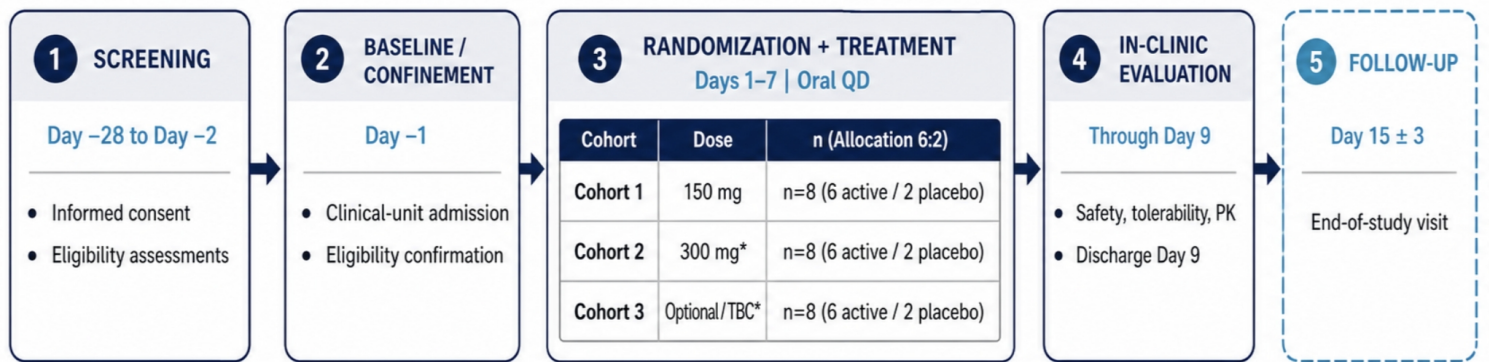
Compound 23 = KP-302 = Lucid-21-302.



Source: Adapted from Tejeda et al., J. Med. Chem. 2017;60:8876–8887, Fig. 2B.

Quantum BioPharma has pursued a methodical clinical development path for LUCID-MS, beginning with safety characterization in healthy volunteers before advancing toward efficacy testing in the target patient population. The program has completed both single-ascending-dose and multiple-ascending-dose Phase 1 trials. The multiple-ascending-dose study was a single-center, randomized, double-blind, placebo-controlled trial administering LUCID-MS orally for seven consecutive days across two dose cohorts, 150 mg and 300 mg, with each cohort enrolling eight participants aged 18 to 60, six receiving active drug and two receiving placebo (see Figure 5).

Figure 5 - Lucid-21-302 Phase 1 Multiple Ascending Dose (MAD)



Source: Adapted from ACTRIMS 2026 Poster

The safety results support continued clinical development, although the study's short duration and small sample size limit conclusions about chronic patient safety. The Phase 1 MAD safety dataset included 16 healthy volunteers, with 12 receiving LUCID-MS across the 150 mg and 300 mg cohorts and four receiving placebo. Across both treatment groups, 38 treatment-emergent adverse events were reported, including 36 mild events and two moderate events. No adverse events among LUCID-MS-treated participants were assessed as study-drug-related, and the study reported no severe or serious adverse events, study-drug withdrawals, or treatment discontinuations (see Table 1).

Table 1 - Treatment-Emergent Adverse Events in the Lucid-21-302 MAD Study. S=subject, E=events.

	Cohort 1 (150mg) (n=6) S (%) E	Cohort 2 (300mg) (n=6) S (%) E	All Placebo (n=4) S (%) E	Overall (n=16) S (%) E
At least one TEAE	5 (83.3%) 9	3 (55.0%) 15	4 (100%) 14	12 (75%) 38
At least one TEAE by mild severity	5 (83.3%) 9	3 (55.0%) 14	4 (100%) 13	12 (75%) 36
At least one TEAE by moderate severity	0	1 (16.7%) 1	1 (25.0%) 1	2 (12.5%) 2
At least one TEAE by severe severity	0	0	0	0

Source: ACTRIMS 2026 Poster

Pharmacokinetic data showed dose-proportional exposure, measured by area under the curve, with no significant accumulation over seven days of once-daily dosing. This profile supports further evaluation in longer-duration patient studies. Exposure at the 300 mg dose, with an AUC_{0-last} of approximately 11,600 ng·h/mL, was approximately 14-fold below the dog no-observed-adverse-effect-level (NOAEL) exposure and 22-fold below the rat NOAEL exposure, while remaining comparable with the 8,500 ng·h/mL AUC_{0-last} reported in the EAE mouse efficacy model (see Table 2). Cross-species exposure comparisons support dose-selection rationale but do not establish comparable CNS exposure, target engagement, or therapeutic activity in humans. The pharmacokinetic observation therefore narrows the exposure-risk question; however, it does not resolve the human pharmacodynamic or clinical-efficacy question.

Table 2 - Human 300 mg Exposure Compared With Preclinical Efficacy and Toxicology ExposuresExposure data from nonclinical and clinical studies. ¹NOAEL. ²Efficacy studies. ³Cohort 2 data.

Species	Dose	Route	AUC_{0-last} (ng·h/mL)	Ratio to Human AUC³
Dog	150mg/kg¹	<i>p.o.</i>	158,000	14
Rat	300mg/kg¹	<i>p.o.</i>	250,000	22
Mouse	50mg/kg²	<i>i.p.</i>	8,500	0.73
Human	300mg³	<i>p.o.</i>	11,600	1

Source: ACTRIMS 2026 Poster

Quantum filed an Investigational New Drug (IND) application for LUCID-MS (Lucid-21-302) to support a Phase 2 trial in progressive multiple sclerosis. Following the FDA's August 10, 2026 clearance of the IND, the company is authorized to initiate a randomized, double-blind, placebo-controlled Phase 2 trial in progressive MS. Based on management's current planning assumptions, first-site activation could occur in February 2027, followed by first-patient enrollment in March 2027. Management currently anticipates completion of enrollment around February 2028, a potential interim analysis in 2Q28 to 3Q28, and topline data around December 2029. These timing assumptions remain preliminary and are subject to final protocol design, site activation, enrollment performance, regulatory interactions, capital availability, and other operational variables.

Management currently expects the trial to include a mixed progressive-MS cohort, potentially encompassing PPMS and SPMS patients. Active and non-active SPMS may be represented, subject to the final protocol. Management has indicated that documented objective disability progression could be a central inclusion feature, using an EDSS increase over the preceding 12 to 24 months that is calibrated to baseline disability. This would clinically enrich enrollment for patients with demonstrated progressive disease rather than depend only on diagnostic classification.

Because Phase 1 demonstrated favorable safety and tolerability in healthy participants, Phase 2 will evaluate the efficacy, safety, and tolerability of LUCID-MS in people with MS. The defining question is whether the myelin-protective and neuroprotective signals observed in animal models translate into measurable clinical benefit in MS patients, using clinical and radiological measures relevant to disability progression and disease biology, while also assessing safety and tolerability. Management currently expects MRI measures and liquid biomarkers, including NfL and GFAP, to be evaluated longitudinally as indicators of treatment response and disease activity rather than used as prospective biomarker-enrollment criteria. This approach may complement clinical and disability-relevant assessments, though the ultimate endpoint hierarchy, permitted background DMT use, treatment duration, dose selection, statistical framework, and protocol specifications are yet to be determined.

The central question is whether longer-duration exposure can maintain the tolerability profile observed in healthy volunteers while producing a credible efficacy signal in objectively progressing patients. Phase 2 will need to establish more than target biology. It must demonstrate that any changes in imaging, biomarkers, or disease measures translate into an interpretable patient-level efficacy signal relevant to progressive MS. Quantum has engaged a global CRO with neurodegenerative-disease experience to support trial implementation, and site selection was underway at the time of the August 2026 announcement.

MGH Imaging Could Sharpen the Readout

Quantum's collaboration with Massachusetts General Hospital could become a useful translational differentiator if the imaging work is integrated into the broader LUCID-MS clinical strategy. The study is evaluating the PET tracer $[^{18}\text{F}]\text{3F4AP}$ as a potential method to directly assess demyelinated neurons with intact axons and track demyelination in patients with MS. Quantum reported in May 2026 that study enrollment had reached the halfway point and that preliminary imaging findings were encouraging, including robust signal in acute MS lesions and potential sensitivity to gray-matter lesions, although these findings remain preliminary and have not established clinical utility for LUCID-MS.

The strategic relevance lies in the potential to measure a biological process more directly related to LUCID-MS's proposed inhibition of demyelination than are conventional relapse- or disability-based endpoints alone. If validated, $[^{18}\text{F}]\text{3F4AP}$ imaging could provide mechanism-relevant pharmacodynamic evidence of myelin-related activity and help link biological changes with functional, clinical, or disability-related outcomes. However, Quantum has not indicated that $[^{18}\text{F}]\text{3F4AP}$ PET will be used for Phase 2 enrollment, patient enrichment, or as a primary Phase 2 endpoint. Management has indicated that MRI measures and biomarkers, including NfL and GFAP, will be evaluated over the course of the study to follow treatment efficacy and disease response, rather than used as enrollment-enrichment criteria. The final protocol and endpoint hierarchy have not been publicly disclosed.

The tracer is not a validated surrogate endpoint for regulatory approval, and favorable PET findings would not independently establish that LUCID-MS improves clinical outcomes. Its value depends on reproducibility, correlation with disease progression and treatment response, operational feasibility in a multi-center trial, and eventual integration with patient-level clinical data. The MGH collaboration is therefore a potentially valuable translational asset. Its eventual relevance to the LUCID-MS development path depends on whether the imaging method is incorporated into future clinical studies and generates a reproducible relationship with clinically meaningful outcomes.

A Market Built Around Peripheral Immune Control

The MS market is dominated by therapies designed to reduce inflammatory activity and relapses. Anti-CD20 therapies, S1P modulators, integrin inhibitors, immune-reconstitution agents, fumarates, interferons, and glatiramoids have established extensive physician familiarity, payer infrastructure, and real-world evidence. LUCID-MS sits outside this established framework by targeting PAD2-mediated citrullination and myelin instability rather than broad immune-cell depletion, sequestration, or suppression.

Table 3 - Selected MS Competitors and Emerging Programs: Positioning LUCID-MS in Myelin Biology

Competitive set	Leading therapies and programs	Key clinical or commercial proof point	Implication for LUCID-MS
Established anti-CD20 DMTs	Ocrevus, Kesimpta, Briumvi	Ocrevus: approved for PPMS; CHF 3.47 billion in 1H26 sales. Kesimpta: \$1.424 billion in 2Q26 sales, +32% YoY at constant currency. Briumvi: approximately one-hour infusion; >22,000 U.S. patients prescribed as of March 2026	Sets the commercial standard for efficacy, convenience, safety, access, and commercial infrastructure
Progressive-disease oral DMTs	Mayzent, tolebrutinib	Mayzent: 21% reduction in three-month confirmed disability progression in EXPAND among SPMS patients. Tolebrutinib: EU-approved for non-relapsing SPMS after a 31% delay in six-month confirmed disability progression in HERCULES	Confirms payer and physician demand for progression-focused therapies, while setting a high efficacy and safety threshold
BTK inhibitors	Fenebrutinib, remibrutinib, orelabrutinib	Fenebrutinib: Phase 3 noninferiority to Ocrevus in PPMS, with a 12% relative reduction in composite 12-week confirmed disability-progression risk; positive Phase 3 RMS data versus teriflunomide. Remibrutinib: Phase 3 RMS readouts expected 2H26. Orelabrutinib: Phase 2 RMS program reported MRI lesion reduction	Most crowded oral pipeline class. BTK inhibitors target B-cell and microglial signaling, potentially raising the efficacy bar in progressive MS, though their mechanism remains distinct from PAD2 inhibition
Non-depleting immune therapies	Frexalimab, obexelimab, LY3541860	Frexalimab: 89% reduction in new Gd-enhancing T1 lesions at Week 12 in Phase 2. Obexelimab: 95% reduction in cumulative new Gd-enhancing T1 lesions over Weeks 8 and 12 versus placebo in Phase 2	Validates the commercial value of avoiding broad B-cell depletion, but these programs primarily target inflammatory activity and do not directly validate PAD2-mediated myelin stabilization
Remyelination and neuroprotection programs	PIPE-307, clemastine, bexarotene, CVL-1001	PIPE-307: Phase 2 VISTA did not meet its primary endpoint despite acceptable tolerability. Clemastine: early studies showed modest VEP-latency improvement; durable clinical benefit remains unestablished. CVL-1001: IND-enabling work completed; no human efficacy data	Scientific interest remains high, but clinical translation has been difficult. LUCID-MS will require evidence of target engagement plus a credible link to imaging, functional, or disability outcomes
PAD2 inhibition	LUCID-MS	Publicly disclosed as a clinical-stage, PAD2-selective small-molecule program. Phase 1 SAD/MAD studies in healthy volunteers reported acceptable tolerability, dose-proportional exposure, no serious adverse events, and no study drug-related TEAEs; MS efficacy remains unproven	Distinct, non-immune-targeted approach to myelin biology. No other publicly disclosed clinical-stage PAD-family inhibitor in MS or another CNS indication was identified to date. Target-level differentiation does not mitigate Phase 2 clinical, biomarker, or translation risk

Source: Generated by Rodman & Renshaw

Footnote: For a complete MS competitive landscape, including approved therapies and pipeline programs, see the Appendix.

Ocrevus: The PPMS Benchmark. Roche (RHHBY, NC) and Genentech’s Ocrevus remains the clinical and commercial benchmark in progressive MS. The anti-CD20 antibody retains the established PPMS label and demonstrated delayed confirmed disability progression versus placebo in the Phase 3 ORATORIO study, anchoring its role in a disease segment with few proven treatment options. Roche reported CHF 3.47 billion in Ocrevus sales during 1H26, up 7% at constant exchange rates, reflecting continued demand across the franchise.

LUCID-MS should not be modeled as a near-term replacement for Ocrevus. Rather, its more credible role is as a future add-on or progression-focused therapy for patients who continue to accumulate disability despite adequate control of inflammatory activity on background DMT treatment. That positioning could expand the addressable population, although it also creates a high evidence threshold because Quantum must demonstrate incremental benefit sufficient to justify added drug cost, pill burden, and payer scrutiny.

Kesimpta reinforces the commercial importance of administration convenience. Novartis (NVS, NC) reported \$1.424 billion of 2Q26 Kesimpta sales, up 32% year over year at constant currencies, supported by demand for its monthly self-administered subcutaneous format. TG Therapeutics (TGTX, NC) markets **Briumvi**, whose approximately one-hour infusion provides another anti-CD20 convenience alternative. Any future LUCID-MS regimen must therefore fit a practical treatment workflow rather than rely on mechanistic differentiation alone.

Fenebrutinib: The Key Rival. Roche (RHHBY, NC) and Genentech’s fenebrutinib is the most consequential emerging LUCID-MS competitor because it combines oral administration, CNS penetration, positive pivotal data in both RMS and PPMS, and Roche’s existing Ocrevus commercial infrastructure. The Phase 3 FENTrepid study achieved noninferiority of fenebrutinib to Ocrevus in PPMS, while FENhance 1 demonstrated a 51% reduction in relapse rate versus teriflunomide (diroximel fumarate, Vumerity, BIIB, NC) and FENhance 2 also met its primary RMS endpoint.

If approved, fenebrutinib could give Roche a route to retain patients within its MS franchise as neurologists seek oral therapies and broader progression-focused options. The principal diligence issue is safety: FENTrepid reported seven on-study deaths in the fenebrutinib arm versus one in the Ocrevus arm. Roche stated that investigators assessed the deaths as unrelated to study treatment and that no causal pattern was apparent, but regulatory review and full data disclosure remain important.

Tolebrutinib: Progression Can Move. Sanofi (SNY, NC) provides important external validation for progression-directed oral drug development through tolebrutinib. The European Commission approved Cenrifki in June 2026 for adults with SPMS without relapses in the prior two years, following HERCULES data showing a 31% delay in six-month confirmed disability progression versus placebo.

Tolebrutinib is more relevant as proof that progression can be modified than as the dominant long-term commercial threat. Its opportunity is constrained by the U.S. complete response letter, missed annualized-relapse-rate superiority in the GEMINI RMS studies, a missed PPMS endpoint in PERSEUS, and liver-monitoring requirements. The product nonetheless establishes a higher clinical and regulatory benchmark for any oral therapy seeking a role in progressive disease.

PIPE-307: The Translation Warning. The remyelination field offers both validation and caution for LUCID-MS. Contineum Therapeutics (CTNM, NC) developed PIPE-307, an oral M1 muscarinic receptor antagonist designed to promote oligodendrocyte precursor-cell differentiation. PIPE-307 failed to meet primary or secondary efficacy endpoints in the 168-patient Phase 2 VISTA study in RRMS. The trial showed no significant improvement in binocular 2.5% low-contrast letter acuity despite acceptable safety and tolerability.

Clemastine, bexarotene, opicinumab, and high-dose biotin provide further examples of remyelination-adjacent strategies that have generated modest, mixed, or non-confirmatory findings. Despite this, these outcomes do not invalidate myelin-directed development, in our view. They show that LUCID-MS must demonstrate more than mechanistic activity. Quantum's Phase 2 needs to connect PAD2 inhibition to credible target engagement and clinically meaningful imaging, functional, or disability-related benefit.

Distinct Target, High Proof Burden. PAD2 inhibition seeks to limit citrullination of myelin proteins, potentially reducing myelin destabilization and downstream immune recognition without broad immune-cell depletion, sequestration, or suppression. No approved MS therapy operates through this mechanism, while the August 11, 2026 target-crowding analysis identified no direct clinical-stage PAD2-selective competitor.

This target differentiation does not equate to clinical de-risking: LUCID-MS enters Phase 2 without patient efficacy data, while Ocrevus has an established PPMS label, tolebrutinib holds an EU approval in non-relapsing SPMS, and fenebrutinib has positive pivotal data in both PPMS and RMS. These programs define neurologist expectations, regulatory standards, and payer assessments of value.

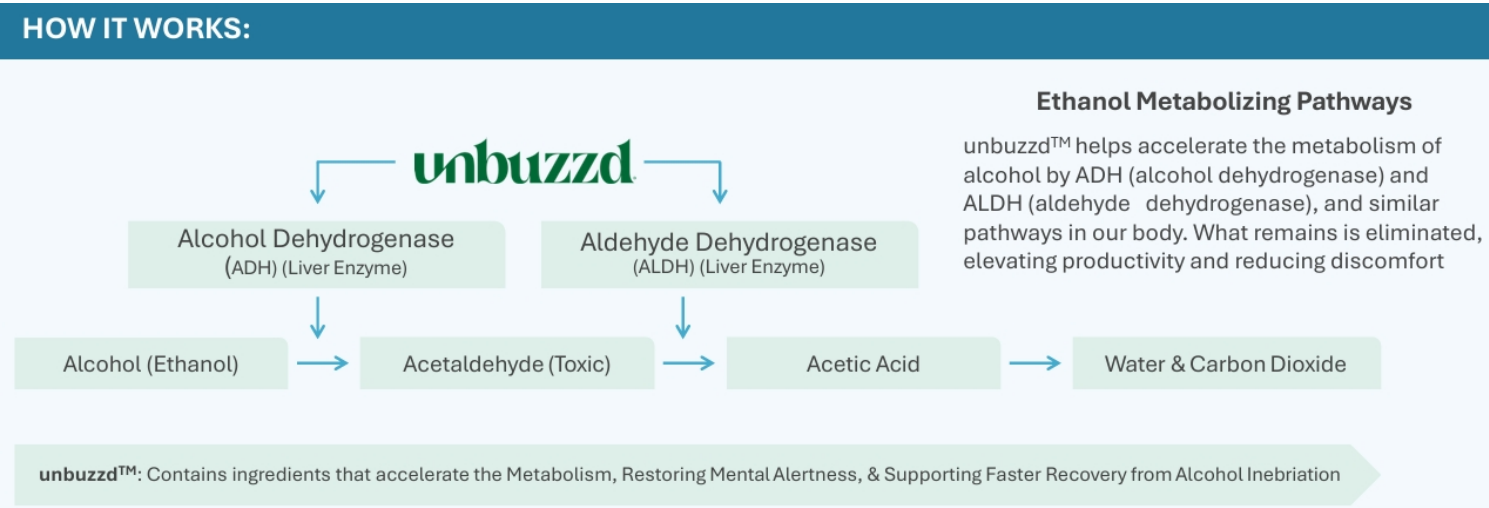
Quantum must show that an oral, non-immunomodulatory PAD2 inhibitor can add meaningful benefit for patients whose inflammatory activity is controlled yet whose disability continues to accumulate. Success could support an add-on positioning that expands the addressable population beyond patients discontinuing an existing DMT. An equivocal result would be difficult to commercialize because a branded therapy will require a clear incremental benefit over the background standard of care.

unbuzzd: A Commercial Option Outside Neurology needs a better title

	Formulation Development	Regulatory Compliance	Final Composition	Technology Transfer/ Commercialization	Clinical Trial	Market Launch
unbuzzd™ (Recreational alcohol misuse treatment)						Q3 2024
REKVRy™ (Hospital and emergency settings alcohol misuse treatment)						

Source: QNTM July 2026 Corporate Presentation

Quantum BioPharma’s MS program carries the long-duration clinical thesis. unbuzzd creates a separate consumer-health route to value creation, structured to provide QNTM with sales-linked participation without requiring the company to build a consumer-products infrastructure. The company developed the formulation, branded in its clinical study as FSD-F2R6, then licensed the OTC consumer opportunity to Unbuzzd Wellness Inc. Quantum retained a 19.48% ownership interest in Unbuzzd Wellness as of June 30, 2026, plus a 7% royalty on unbuzzd sales until cumulative royalties paid to Quantum reach \$250 million. The royalty then declines to 3% in perpetuity. Importantly, Quantum retains all medical and pharmaceutical rights to related alcohol-misuse formulations, preserving REKVRy and other clinical-development opportunities outside the consumer license. FSD-F2R6 is Quantum’s underlying formulation, unbuzzd is the consumer-facing branded product commercialized by Unbuzzd Wellness, and REKVRy represents a potential future medical or pharmaceutical-development program retained by Quantum outside the consumer license.



Source: QNTM July 2026 Corporate Presentation

The structure gives Quantum exposure to a potentially large consumer category while transferring branding, inventory, retail placement, digital acquisition, and distribution responsibilities and associated costs to Unbuzzd Wellness. Management has identified Puerto Rico distribution, AATAC-related retail expansion, prospective TikTok Shop and iHerb launches, affiliate and ambassador programs, retail-display formats, and paid social-media testing as key commercialization initiatives. This approach is strategically rational for a clinical-stage company with finite resources. LUCID-MS can remain the focus of internal capital allocation while unbuzzd serves as a potential source of future royalty income and equity-value appreciation. Quantum expects to monetize its unbuzzd interests through sales-linked royalties, potential appreciation or disposition of its 19.48% ownership stake if a financing or liquidity event occurs, and potential future development of retained pharmaceutical rights. Management has identified a possible disposition of its Unbuzzd stake as a contingent non-dilutive funding source for LUCID-MS development.

The consumer proposition benefits from a small randomized, double-blind, placebo-controlled crossover study of FSD-F2R6 in healthy adults. The study reported lower breathalyzer-measured BAC at selected post-dose timepoints, reduced four-hour BAC AUC (see Table 4), and

exploratory improvements in measures of impairment, alertness, fatigue, and headache versus placebo. This evidence may help differentiate the product within the alcohol-recovery category. However, the study enrolled only 26 participants, measured BAC through breathalyzer readings, and does not establish that unbuzzd treats alcohol intoxication, alcohol-use disorder, or any medical condition.

Table 4 - FSD-F2R6 Versus Placebo, BAC Over Time

Time (min)	FSD-F2R6 Mean (SD)	Placebo Mean (SD)	Difference (FSD-F2R6 – Placebo)	<i>p</i>-value	<i>d</i>
0 (BAC)	0.1073 (0.0152)	0.1065 (0.0134)	0.0007	0.726	0.072
30 (BAC)	0.0824 (0.0152)	0.0851 (0.0137)	-0.0027	0.033*	-0.452
60 (BAC)	0.0737 (0.0146)	0.0770 (0.0122)	-0.0034	0.021*	-0.523
90 (BAC)	0.0676 (0.0134)	0.0701 (0.0136)	-0.0025	0.079 ^a	-0.400
120 (BAC)	0.0615 (0.0143)	0.0631 (0.0143)	-0.0016	0.191	-0.285
180 (BAC)	0.0495 (0.0148)	0.0522 (0.0142)	-0.0028	0.066 ^a	-0.407
240 (BAC)	0.0329 (0.0143)	0.0355 (0.0140)	-0.0026	0.041*	-0.463
AUC	15.0408 (3.3347)	15.6132 (3.0886)	-0.5724	0.026*	-0.487

Source: Chruscinski and Hoskins, 2026, Table 4

The economic leverage is meaningful once sell-through is established. QNTM's 7% royalty would convert \$10 million of annual unbuzzd gross sales into \$0.7 million of annual royalty income, \$25 million of sales into \$1.75 million, and \$50 million into \$3.5 million. These calculations are illustrative and should not be mistaken for estimates of current revenue or management guidance. The contractual royalty rate remains 7% until cumulative payments to Quantum reach \$250 million, after which it becomes 3% in perpetuity. Management has confirmed that Quantum has commenced recognition of royalty revenue under the 7% entitlement. The revenue recognized to date is negligible because current unbuzzd sales remain limited. Management expects sales could increase following completion of Unbuzzd Wellness's current financing round, though it did not provide cumulative sales, active retail-door, e-commerce, reorder-rate, or revenue-run-rate data.

unbuzzd is best understood as a clinically supported consumer-health option embedded within Quantum's broader platform. Its royalty structure, retained ownership stake, and preserved pharmaceutical rights give QNTM multiple paths to participate in value creation. Its commercial significance remains unproven because sales, retail penetration, e-commerce performance, consumer repeat purchase, and royalty remittances have not been quantified publicly. Near-term valuation relevance depends on Unbuzzd Wellness converting planned retail and digital distribution initiatives into sustained consumer demand, material royalty income, or a liquidity event that enables Quantum to monetize its equity interest. Until then, unbuzzd should be viewed as contingent, non-core optionality rather than a near-term revenue driver.

Financial Outlook & Revenue Drivers

Quantum BioPharma enters the LUCID-MS Phase 2 period with improved liquidity, lower operating expenses, and a portfolio that offers two distinct monetization paths: clinical value creation through LUCID-MS and potential consumer royalty income through unbuzzd. At June 30, 2026, Quantum reported approximately \$9.5 million of combined cash, cash equivalents, and digital assets, versus approximately \$4.1 million at December 31, 2025. Management expects available liquidity to fund planned operations through at least October 2027, assuming cash burn remains consistent with the 1H26 rate.

Total operating expenses declined 53% year over year to \$2.29 million, including a 47% decline in G&A to \$1.76 million. Cash used in operating activities fell 44% to \$3.46 million in 1H26 from \$6.21 million in 1H25. The leaner run rate provides a more credible bridge into LUCID-MS Phase 2 start-up. It should not be viewed as a steady-state spending level because clinical-site activation, enrollment, drug supply, monitoring, and data-management costs should rise as the progressive-MS study advances. Management currently expects Phase 2 activation in early 2027, a potential interim analysis in 2Q28 to 3Q28, and topline data around December 2029. These are preliminary planning assumptions and remain subject to final protocol design, site activation, enrollment, financing, regulatory interactions, and trial execution.

LUCID-MS is the central medium-term valuation driver rather than a near-term revenue source. FDA clearance of the company's IND enables a randomized, double-blind, placebo-controlled Phase 2 trial in progressive MS. Value creation over the next 12 to 18 months will depend on trial execution, enrollment progress, safety observations, potential imaging or biomarker readouts, and eventual clinical efficacy data. Management currently estimates the all-in Phase 2 program at approximately \$15 million. Given Quantum's approximately \$9.5 million of combined cash, cash equivalents, and digital assets at June 30, 2026, additional capital is expected before Phase 2 topline data under the current plan. Management expects to use equity raises and ATM utilization, with a potential future disposition of its Unbuzzd ownership stake representing a contingent non-dilutive alternative.

unbuzzd represents QNTM's only visible route to a potential recurring revenue stream before LUCID-MS commercialization. Quantum owns 19.48% of Unbuzzd Wellness and receives a 7% royalty on unbuzzd sales until cumulative payments to Quantum reach \$250 million. The royalty then declines to 3% in perpetuity. QNTM retains all medical and pharmaceutical rights to related alcohol-misuse formulations, including REKVRY. The licensing structure allows QNTM to participate in consumer sales without directly funding product marketing, inventory, distribution, or retail execution. Quantum has commenced recognition of revenue under its 7% royalty entitlement, although management characterized the amount recognized to date as negligible because unbuzzd sales remain limited. Unbuzzd has not disclosed cumulative gross sales, royalty payments received, retail sell-through, active retail doors, e-commerce contribution, reorder rates, or a current sales run rate. The base case should therefore assign limited near-term value to royalty income until commercial data become available. The \$452,741 Unbuzzd-related gain on debt settlement reported during 2Q26 was a non-cash accounting gain, not consumer sales or royalty income.

Quantum's financial outlook is therefore driven by disciplined deployment of its current liquidity into LUCID-MS Phase 2 execution while waiting for evidence that unbuzzd distribution translates into recurring sales and royalty receipts. The company has improved its runway and reduced burn. Future valuation will depend on whether clinical progress, financing execution, and consumer commercialization mature before additional equity issuance becomes necessary.

Valuation and Risks

Our valuation is based on a sum-of-the-parts DCF, reflecting Quantum BioPharma's distinct value drivers: LUCID-MS, the recurring royalty and equity-income stream associated with unbuzzd, the Company's net cash position, plus a modest deduction for other pipeline-related operating costs. Applying a 13% WACC and 2% terminal-growth rate, the model generates an enterprise value of approximately \$97.3 million. After applying a 25% execution haircut, adding \$9.7 million of cash, investments, and digital assets as of 2Q26, then deducting \$0.4 million of debt, the model yields implied equity value of approximately \$82.3 million. On 10.4 million fully diluted shares, this supports an intrinsic value of roughly \$7.94 per share, rounded to an \$8 price target.

LUCID-MS represents the principal source of modeled upside, contributing \$60.2 million of enterprise value, or \$5.81 per share. The model assumes risk-adjusted peak sales of \$104.2 million, based on unadjusted peak sales of \$527.9 million, reflecting an approximately 19.7% probability of success consistent with the program's early clinical stage. unbuzzd contributes a further \$38.3 million of enterprise value, or \$3.70 per share, supported by Quantum's 7% royalty on sales plus its 19.48% ownership interest in Unbuzzd Wellness. Net cash, investments, and digital assets contribute \$0.90 per share, partially offset by a \$0.12-per-share negative value assigned to other pipeline activities.

Disclosure: The valuation tables below are sourced from the attached published financial model.

Component / Program (in US\$ million)	Peak Sales	Launch Year	Peak Year	PoS	Risk Adjusted Peak Sales	EV	Per Share
LUCID-MS -Multiple Sclerosis	\$528	FY2032	FY2038	20%	\$104	\$60	\$5.8
Unbuzzd	\$9	FY2026	FY2040	100%	\$9	\$38	\$3.7
Pipeline	-	NA	NA	NA	-	(\$1)	(\$0.1)
Enterprise Value	\$537				\$113	\$97	\$9.4
Execution Haircut						25%	
Cash, Investments, and Digital Assets						\$10	\$0.9
Debt						\$0	(\$0.0)
Equity Value						\$82	
Common Stock Outstanding						8.1	
Potentially Dilutive Securities						2.3	
Shares Outstanding (Fully Dilutive) (in million)						10.4	
Target Price (US\$ per Share)						\$8.0	\$8.0

Assumed WACC: 13%, Assumed sustainable growth rate: 2%

The valuation is especially sensitive to LUCID-MS clinical advancement, eventual market uptake in progressive MS, financing requirements before sustained operating cash generation, and the commercial trajectory of unbuzzd. The model forecasts negative cash balances beginning in 1Q27 without additional financing, making future capital raises and associated dilution a central consideration in interpreting the \$8 target.

Valuation Summary (in US\$ million)

Implied enterprise value	97.3
Execution Haircut	25%
Add: Cash and cash equivalents (2Q26)	3.6
Add: Investments (2Q26)	0.2
Add: Digital Assets (2Q26)	5.9
Less: Total debt	0.4
Implied market cap	82.3
Fully diluted shares (in million) (3Q26)	10.4
Fair value (US\$ per share)	8.00

Risks: LUCID-MS has not yet been tested in MS patients, and Phase 1 data from healthy volunteers do not establish safety, tolerability, or efficacy in progressive MS. The FDA cleared the IND on August 10, 2026, and the Company had begun Phase 2 operational preparation, including investigator appointment and CRO-supported site-selection activities; however, trial execution, recruitment, dose selection, endpoint sensitivity, and demonstration of clinical benefit remain material uncertainties.

Quantum's limited cash position relative to likely Phase 2 costs could necessitate additional financing and shareholder dilution before meaningful clinical data are available. Reliance on licensing partners for unbuzzd revenue also limits Quantum's control over commercialization, market access, and revenue realization. Competitive advances, intellectual-property challenges, small-cap liquidity, and capital-markets volatility could further impair valuation.

These risks could delay development, increase cash burn, require dilutive financing, and impede price-target achievement.

Company description

Quantum BioPharma is an R&D-focused biopharmaceutical company centered on LUCID-MS (Lucid-21-302), a potentially first-in-class, non-immunomodulatory small molecule designed to inhibit PAD2-mediated citrullination of myelin proteins and protect against demyelination in progressive multiple sclerosis. This myelin-protective approach differs from the immune-directed disease-modifying therapies that dominate the current MS treatment landscape. Quantum holds 100% exclusive worldwide rights to the compound, which was discovered by Dr. Lakshmi Kotra's team at University Health Network following more than 14 years of preclinical research. Phase 1 single- and multiple-ascending-dose studies in healthy volunteers were completed, with no serious adverse events or study-drug-related adverse events reported in the MAD study. The FDA cleared the LUCID-MS IND on August 10, 2026, enabling the planned Phase 2 trial in progressive MS. Beyond LUCID-MS, Quantum holds a 19.84% equity interest in Unbuzzd Wellness plus a 7% royalty on unbuzzd sales, declining to 3% after cumulative royalty payments reach \$250 million. The Company also retains 100% of rights to REKVRY and related medical or pharmaceutical alcohol-misuse applications, providing potential partnership and royalty income alongside its core neurology program.

Important Disclosures

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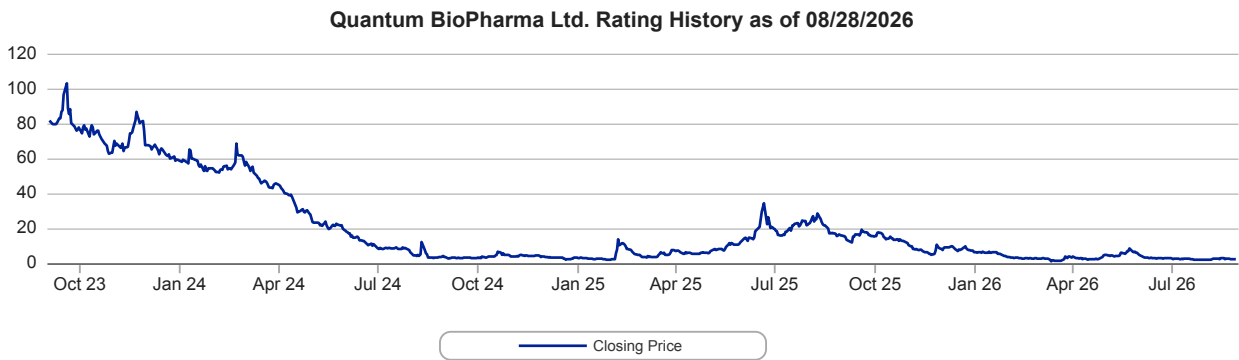
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Ratings	Count	Percent	IB Service/Past 12 Months	
			Count	Percent
BUY	32	100.00%	6	18.75%
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