

低分子医薬品

既存薬の応用展開で、 筋強直性ジストロフィー難治性疾患 患者の検証試験準備中

Completed Phase 2 Clinical Proof-of-Concept:
safety established and RNA-splicing biomarker signals observed

Multicenter, Randomized, Double-Blind, Placebo-Controlled Phase 2 Trial in Japan
30 adult DM1 patients | 24 weeks | erythromycin 500 or 800 mg/day vs placebo

1. Safety / tolerability

No treatment discontinuation, no deaths, and no serious safety signal in erythromycin groups.

2. Splicing biomarkers

Significant improvements in MBNL1 ($p=0.048$) and CACNA1S ($p=0.042$) in the overall erythromycin group.

3. Functional readiness

CK decrease trend and slight 6MWT upward trajectory support a larger, longer confirmatory trial.



神経内科学
中森 雅之

Erythromycin Repurposing for Myotonic Dystrophy Type 1 (DM1)

An oral small-molecule approach targeting RNA toxicity

エリスロマイシンによる筋強直性ジストロフィー1型（DM1）治療

RNA毒性を標的とする経口小分子治療の企業導出・共同開発提案

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Executive Summary

Repurposed oral erythromycin as a practical disease-modifying candidate for DM1

Purpose

Advance a first-in-class small-molecule therapy that mitigates toxic CUG-repeat RNA and abnormal splicing in DM1.

Modality / Target

Oral, low-molecular-weight drug repositioning approach targeting RNA toxicity and MBNL sequestration.

Current Status

Phase 2 clinical trial completed: safety/tolerability established and biomarker signals observed.

Value Proposition

A clinically de-risked, patient-friendly development seed for a rare disease with high unmet medical need.

Phase 3 protocol preparation and corporate partnering are the immediate next steps.

Partnering Ask

- Out-licensing or co-development for Phase 3 and commercialization
- Support for regulatory strategy, manufacturing, supply, and global development

Backgrounds / Targeted Goal

DM1 has no fundamental therapy; Erythromycin addresses the upstream RNA toxicity mechanism

Unmet Need in DM1

- Adult-onset progressive multisystem disorder
- Muscle weakness, myotonia, cardiac/endocrine/CNS symptoms
- No approved disease-modifying treatment

Mechanistic Rationale

CTG expansion
DMPK gene

→ Toxic CUG RNA
nuclear foci

→ MBNL trapped
splicing error

Targeted Goal

First practical oral therapy for DM1

Designed to improve RNA toxicity biomarkers and translate into functional benefit in a larger confirmatory study.

Therapeutic concept

Erythromycin is expected to reduce toxic RNA effects, release MBNL function, and normalize disease-relevant splicing.

Key Data

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Molecular efficacy signal

MBNL1
 $p = 0.048$

CACNA1S
 $p = 0.042$

EClinicalMedicine
2024;67:102390

Result supports Phase 3-ready partnering discussion

Other Data

Non-confidential evidence package available now

→ Detailed package including unpublished information can be disclosed under NDA

Other available non-confidential data

- Published Phase 2 protocol and results
- Published preclinical mechanism and efficacy data
- Published splicing biomarker rationale
- Patent family information and development summary

After execution of Non-Disclosure Agreement

- Detailed clinical dataset and biomarker analysis plan
- Phase 3 protocol concept and statistical assumptions
- Regulatory, manufacturing, and supply requirements
- Licensing scope, development budget, and commercialization plan

Reference (Patents / Key Papers)

Key non-confidential publications and intellectual property supporting the program

Key clinical paper

Nakamori M. et al. Erythromycin for myotonic dystrophy type 1: a multicentre, randomised, double-blind, placebo-controlled, phase 2 trial. *EClinicalMedicine*. 2024;67:102390.

Preclinical rationale

Nakamori M. et al. Oral administration of erythromycin decreases RNA toxicity in myotonic dystrophy. *Ann Clin Transl Neurol*. 2016;3:42–54.

Biomarker foundation

Nakamori M. et al. Splicing biomarkers of disease severity in myotonic dystrophy. *Ann Neurol*. 2013;74:862–872.

Patents

MYD-0124 / erythromycin for DM1: JP6460552B2, US10500223B2, EP3323419B1
[Patent applicant: The University of Osaka]

Competitive Advantage

A clinically de-risked oral small molecule for RNA-toxicity modulation in DM1

Clinical POC

Human Phase 2 data already available

Oral delivery

No vector, injection device, or tissue-targeting carrier required

Known drug class

Long clinical-use history supports safety planning

Development speed

Repurposing can shorten CMC and nonclinical path

Positioning versus emerging DM1 modalities

Complementary differentiation

Erythromycin offers an oral, systemic, small-molecule route that may be easier to dose and scale than nucleic-acid or gene-delivery approaches. Efficacy must be confirmed in a well-powered trial.

Key message: ready for industry partnership to convert Phase 2 signals into confirmatory development.

Research & Development Roadmap

Partnering now enables a focused transition from Phase 2 POC to confirmatory development



2026–2027 Decision Point

- Select corporate partner and development model
- Finalize Phase 3 design, regulatory pathway, and drug supply

Value-creation Milestones

- Initiate confirmatory trial
- Demonstrate clinically meaningful benefit and prepare for approval

Our Team

Clinical, translational, statistical, and regulatory capabilities assembled around a Phase 3-ready seed

Program Lead / PI

Masayuki Nakamori
Neurology, The University of Osaka

Clinical Development

Osaka University Hospital
MTR (Medical Center for Translational Research)

Biostatistics & Trial Design

Biostatistics and data-science collaborators

Clinical Sites / Registry

Multicenter neuromuscular network
REMUDY collaboration

Industry Partner

CMC, regulatory execution, Phase 3 operations, commercialization

Partnership model

Academic seed and clinical know-how × corporate development capability for efficient Phase 3 execution.

Proposed Partnership Scheme

Seeking a corporate partner for licensing or co-development toward Phase 3 and commercialization

Academic Side

- Disease biology and biomarker expertise
- Clinical POC data and protocol concept
- Investigator network and patient-registry linkage

Corporate Partner

- Drug supply / CMC and quality strategy
- Regulatory execution and trial operations
- Global development and commercialization

Shared Goal

- Confirm efficacy in a well-powered trial
- Create a new treatment option for DM1
- Deliver patient-accessible oral therapy

Flexible collaboration options can be discussed after data review under NDA.

- ◆ Out-licensing
- ◆ Co-development including financial support
- ◆ Option agreement
- ◆ Region-specific partnership