



Financial Results for FY02/2023

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# Create impactful therapeutics by the power of relentless exploration and challenge



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# Topics



## Topics



#### TMS-007 (BIIB131) update

 Biogen has announced to initiate a Ph2b clinical trial in the first half of 2023. (Detailed clinical trial information is available at ClinicalTrials.gov.) 1

#### 2 Reduced net loss for the full year

- Operating loss and net loss have been reduced, compared to the forecast disclosed at the Initial Public Offering (IPO).
- Operating loss: 896m yen → 520m yen (376m yen, +42% vs forecast)
   Net loss: 1,230m yen → 860m yen (369m yen, +30% vs forecast)

#### 3 Co-founder Dr. Keiji Hasumi joined as full-time CSO

- Dr. Keiji Hasumi, Ph.D., the company's co-founder who was behind TMS-007 R&D, became CSO (Chief Scientific Officer), following his retirement from a full-time professor at Tokyo University of Agriculture and Technologies (TUAT) as of April 1, 2023.
- The company and TUAT establishes a collaborative research program and continue cooperation.

# Summary of Financial results for FY02/2023





#### Recorded losses for Ordinary Income and Net Income for FY02/2023

				(million yen)	
		02/2022	02/2023	Increase/ decrease	
Operating revenue		1,946	-	(1,946)	
Operating expenses		810	520	(290)	
	Research and development expenses	304	297	(6)	
Operating income		1,135	(520)	(1,655)	
Non-operating income		38	0	(38)	
Non-operating expenses		95	341	246	-
Ordinary income		1,079	(861)	(1,940)	
Net income		1,076	(860)	(1,937)	

Expected expenses for FY02/2024	(million yen)
Research and Development expenses	500 - 800
Other selling, general and administrative expenses	350 - 450

No revenue was recorded in FY 02/2023, in contrast to FY02/2022 when there was revenue from Biogen's option exercise.

The expenses remained at low level due to;

- TMS-007 related expenses no longer incurred since FY02/2022.
- Other projects are still in the research phase.

Increase in IPO-related expenses.

R&D expenses are mainly for;

- Development of TMS-008
- Research activities for pipeline expansion
- Introduction of external assets



Cash and cash equivalents increased by 986m yen mainly due to issuance of new shares with IPO in November 2022. Runway until TMS-007 next milestone event is estimated to be secured.

		(million yen)	
	02/2022	02/2023	
Cash flows from operating activities	1,261	(688)	No income in FY02/2023. For FY02/2022, positive
Income before income taxes	1,079	(861)	cashflow was due to option exercise revenue from Biogen.
Cash flows from investing activities	(16)	(13)	
Cash flows from financing activities	246	1,688	Proceeds from the issuance of shares exceeded the outflow of
Income from the issuance of shares	249	2,109	420m yen for IPO expenses.
Net (decrease) increase in cash and cash equivalents	1,491	986	
Cash and cash equivalents at beginning of period	1,106	2,598	
Cash and cash equivalents at end of period	2,598	3,584	



Total assets increased due to financing from IPO in November 2022

			(million yen)	
	02/2022	02/2023	Increase/ decrease	
Current assets	2,722	3,766	1,043	
Cash and deposits	2,598	3,584	986	Cash and deposits increased due
Non-current assets	16	23	6	to IPO.
Total assets	2,739	3,790	1,050	
Current liabilities	285	76	(209)	Mainly accrued royalties payable
Non-current liabilities	1	-	(1)	were recorded in FY02/2022.
Total liabilities	286	76	(210)	
Total net assets	2,453	3,714	1,261	
Total liabilities and net assets	2,739	3,790	1,050	



TMS-007 Ph2a completed: Ph2b of TMS-007 (BIIB131) to be initiated by Biogen TMS-008 Preclinical stage: Being developed by TMS under grant-back license from Biogen



The above information contains forward-looking statements based on our judgement in light of the information currently available to us. Therefore, please be aware that the above information is subject to various risks and uncertainties, and actual development may differ significantly from these projections.

1. Biogen has registered and published detailed clinical trial information in ClinicalTrials.gov on March 10, 2023. <a href="https://clinicaltrials.gov/ct2/show/NCT05764122">https://clinicaltrials.gov/ct2/show/NCT05764122</a>

2. Our development rights for TMS-008 and TMS-009, which are being developed under a free license from Biogen, are limited to certain indications, and TMS-009 is a backup compound for TMS-008.

# TMS-007

Potential Next Generation Acute Ischemic Stroke Treatment



## Acute Ischemic Stroke - Important Unmet Medical Needs



#### Acute Ischemic Stroke (AIS) Overview



#### Important Unmet Medical Needs

#	Disease	Ratio	Breakdown of Stroke <sup>4</sup>
1	Heart Disease	23.1%	Others
:	:	:	13%
4	CLRD	5.5%	
5	Stroke	<u>5.3%</u>	AIS 87%
6	Alzheimer	4.3%	

Cause of death in the US (2019) <sup>3</sup>

Datamonitor Healthcare, "Stroke Epidemiology", Ref Code:DMKC0201444, Published on 07 January 2019
 5 European countries are composed of five major countries: Germany, France, Italy, Spain, and United

 5 European countries are composed of five major countries: Germany, France, Italy, Spain, and United Kingdom

3. Centers for Disease Control and Prevention, "National Vital Statistics Reports volume 70"

4. Tsao et al. (2022) Heart Disease and Stroke Statistics—2022 Update: A Report From the American Heart Association



 National Stroke Association, Explaining stroke 101, 2011; Current, future and avoidable cost of stroke in the UK, 2017; Yamaga et al. (2016), "Cost of illness in cerebrovascular disease" Calculation based on exchange rates; USD/JPY=110, USD/GBP=1.3

6. Estimated COI based on direct and indirect costs related to stroke for 1 year until November 2015

Stroke causes significant economic loss <sup>5</sup>



#### the only FDA-approved drug for AIS

#### Market size <sup>1</sup> of the existing drug

Sales of t-PA is estimated to be approx. \$2.1bn in 2021



#### Challenges of the existing drug



- t-PA (tissue Plasminogen Activator): the only FDA-approved drug for AIS (thrombolytic agent)
- t-PA generally needs to be administered within 4.5 hours from symptom onset and is used for <10% of patients <sup>6</sup>
- 1. Informa; estimated as the sum of sales of Activase® and Actilyse® for each year
- 2. As Actilyse® sales in 2020 is not available, Actilyse® sales in 2019 is used for estimation for 2020
- 3. Incidence rate at 7 days
- 4. Mortality at 90 days

5. Emberson et al. (2014), "Effect of treatment delay, age, and stroke severity on the effects of intravenous thrombolysiswith alteplase for acute ischaemic stroke: a meta-analysis of individual patient data from randomised trials"

6. Audebert et al. Nat. Rev. Neurol. 10.675-676, 2014 'Time is brain' after stroke, regardless of age and severity



#### Dual mechanism - "Anti-inflammatory" and "Thrombolytic" activities



Our SMTP-based small molecule analogues with unique therapeutic properties

Anti-inflammatory and thrombolytic activities Ideal profile for acute ischemic stroke treatment

- 1. Matsumoto et al. (2014) J Biol Chem
- 2. Shibata et al. (2011) N-S Arch Pharmacol
- 3. Ito et al. (2014) Brain Res
- 4. Hasumi et al. (2010) FEBS J
- 5. Hu et al. (2012) Thrombosis J
- 6. Miyazaki et al. (2011) Stroke

# TMS-007 (BIIB131): Acquired by Biogen, the U.S. Biotech Company



#### Biogen exercised its option to acquire all IP and assets related to TMS-007 and SMTP compound in May 2021 <sup>1</sup>



Primary targets are neurological diseases

- 3. Biogen Inc (BIIB) market capitalization as of February 28, 2023

A percentage of worldwide annual sales of TMS-007 (under certain circumstances, payment 15 4 may decrease due to changes in the cap)



TMS-007 has the potential to become the first line AIS treatment  $^1$ 

Time Window	Efficacy	Safety	
Therapeutic time window	mRS <sup>2</sup> 0-1 ratio at 90 days Gold-standard Endpoint	Symptomatic Intracerebral hemorrhage risk <sup>3,4</sup>	
TMS-007 <12.0	TMS-007 40.4% Odds ratio <sup>5</sup> : 3.00 Adjusted odds ratio <sup>5</sup> : 3.34	TMS-007 0%	
t-PA <4.5	Placebo 18.4 %	Placebo 3%	
(hour) 0 5 10 15	■ 0-1 ■ 2-6	0% 5% 10%	
<ul> <li>Clinical trials indicate that TMS-007 may work in potentially longer time window (within 12h).</li> <li>mRS score 0-1 indicates realized a level that does not interf daily life, and "Gold-standa endpoint with statistical sig (P value ≤ 0.05) was achied</li> </ul>		<ul> <li>TMS-007 showed the potential to overcome the biggest problem of t-PA.</li> </ul>	

- 1. The data comparisons above are not based on head-to-head clinical studies. Number of patients(N)=52 for TMS-007, N=3,391 and N=2,488 for t-PA
- 2. mRS indicates modified Rankin Scale, and it refers to degree of independence in daily life
- 3. Biogen, Investor Day Material (September 21, 2021), Q4 and Full Year 2021: Financial Results and Business Update
- 4. Wardlaw et al. (2012), "Recombinant tissue plasminogen activator for acute ischaemic stroke: an updated systematic review and meta-analysis", N=2,488
- 5. Calculation of each odds ratio;
  - TMS-007: odds ratio 3.0=(40.4%/59.6%)/(18.4%/81.6%), adjusted odds ratio 3.34, (statistically adjusted to control for other predictor variables; Source: ISC2022 Poster) 16

TMS-007 achieved <u>statistically significant improvement</u> on mRS 0-1 ratio at 90 days, one of the most important indicators

	Placebo	TMS-007
Number of patients (N)	38	52
Number of patients scored mRS 0-1	7	21
mRS 0-1 ratio	18.4%	40.4%

- Odds ratio 3.00, Adjusted odds ratio 3.34
- P value  $\leq 0.05$

mRS 0-1 ratio at 90 days<sup>1</sup>





1. Biogen, Investor Day Material (September 21, 2021), Q4 and Full Year 2021: Financial Results and Business Update



TMS-007's promising efficacy is potentially backed by good recanalization outcome  $^1$ 

Effect of vessel recanalization confirmed for patients with full or partial vascular occlusion - MRA image





the percentage of subjects receiving TMS-007 achieving recanalization was

#### greater than those treated with placebo

	Placebo Pooled	TMS-007 Pooled
Number of patients (N)	15 (100)	24 (100)
Number of patients with recanalization	4 (26.7)	14 (58.3)
Estimate of odds ratio (TMS-007 vs placebo)	-	4.23
95% CI for the odds ratio	-	0.99, 18.07

1. Biogen, Investor Day Material (September 21, 2021), Q4 and Full Year 2021: Financial Results and Business Update

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In terms of safety, the biggest concern of t-PA, TMS-007 demonstrated reduced risk of the incidence of symptomatic Intracerebral Hemorrhage (sICH)  $^1$ 



1. The data comparisons below are not based on head-to-head clinical studies. N=52 for TMS-007, N=3,384 for t-PA

2. Biogen, Investor Day Material (September 21, 2021), Q4 and Full Year 2021: Financial Results and Business Update

3. Wardlaw et al. (2012), "Recombinant tissue plasminogen activator for acute ischaemic stroke: an updated systematic review and meta-analysis"



#### Summarized information, based on the publicly available information registered by Biogen<sup>1</sup>

<ul> <li>Outline</li> <li>Multicenter, operationally seamless, double-blind, dose-ranging, placebo-controlled, randomized, parallel-group</li> <li>Estimated enrollment: 760 participants</li> <li>Estimated duration: Apr 2023 – July 2025</li> </ul>				
<ul> <li>Key Inclusion Criteria</li> <li>"Patients with thrombus site confirmed by imaging"<sup>2</sup> or "Patients with an estimation of penumbra <sup>3</sup> volume to be ≥ 10ml"<sup>4</sup></li> <li>Presentation and treatment start are within 4.5 - 24 hours of LKW <sup>5</sup></li> <li>No statement regarding limitations with or without endovascular therapy</li> <li>Age 18 - 85 years</li> </ul>				
Part 1	Part 2			
4 groups: Low, Medium and High dose, and Placebo <u>Primary Outcome Measures</u>	2 groups: a single dose specified in Part1 and Placebo Primary Outcome Measures			

2.

3. 4.

For patients with no visible occlusion at baseline, >90% reduction of Tmax > 6s at 4  $\pm$  2 hours after treatment completion.

The above information are summarized by TMS Co., Ltd., based on the information registered and published in ClinicalTrials.gov (https://clinicaltrials.gov/ct2/show/NCT05764122) by Biogen. Therefore, the accuracy of the information cannot be assured. Patients with CTA or MRA showing symptomatic intracranial occlusion, at one of the following locations: intracranial internal carotid, M1, M2 or distal branches of the middle cerebral artery (MCA), anterior cerebral artery (ACA), or posterior cerebral artery. Penumbra is an area of brain, in the early (hyperacute) phase of cerebral infarction, where blood flow is reduced but cells have not yet become necrotic, and rapid vascular recanalization is expected to prevent the area from transition to infarction. Patients with the volume of Tmax>6s to be  $\geq$ 10 mL on perfusion imaging.

<sup>5.</sup> LKW: Last Know Well, meaning the last time patient was confirmed to be normal before symptoms startedC 6.

Patients with an AOL score of 2 or 3 at 4 ± 2 hours post-treatment (or at the time of the first angiogram for patients undergoing endovascular therapy). 7.



#### Summarized information, based on the publicly available information registered by Biogen<sup>1</sup>

	Ph2a	Ph2b
Basic design	1 stage	2 stages (Part 1、Part 2)
Enrollment	90	760 (Estimated)
Primary efficacy endpoint	mRS 0-1 ratio	<ul> <li>Part 1 • Arterial revasculization</li> <li>• Reduction of at least 90% of penumbra</li> <li>Part 2 • mRS score</li> </ul>
Ages eligible for trial	Male: 20 - 88 years Female: 60 - 88 years	18 - 85 years
Time window	Within 12 hours after on set	Within 4.5 - 24 hours of LKW
Endovascular therapy (EVT)	Only for patients without EVT	May include patients undergoing EVT
Pre-treatment score of NIHSS	6 - 23 (Patients with moderate symptoms)	≥5 (Severe patients are also eligible)

1. The above information are summarized by TMS Co., Ltd., based on the information registered and published in ClinicalTrials.gov (<u>https://clinicaltrials.gov/ct2/show/NCT05764122</u>) by Biogen. Therefore, the accuracy of the information cannot be assured.



#### Potential Market Size for TMS-007 with possible outstanding Efficacy and Safety



- TMS-007 has potential to realize the expansion of time window
  - ⇒ Total addressable patients of TMS-007 may expand significantly
- If TMS-007 can achieve higher efficacy and safety than t-PA, higher drug price could be expected (sales of t-PA estimated to be approx. \$2.1bn in 2021<sup>1</sup>)

<sup>1.</sup> For 2021, Informa; calculated as the sum of estimated sales of Activase® and Actilyse® in 2021. Actual market size may differ from the estimate due to the limitations peculiar to such statistical data and publications in terms of their accuracy

(Percentage of patients <sup>1</sup>)

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#### Relationship between Prehospital Time and treatment<sup>1</sup>

- Number of t-PA treated patients is only a part of entire patient population arriving at a hospital
- Time window expansion for TMS-007 could expand the target patient population <sup>2</sup>



1. TMS assumption using average breakdown of patients by prehospital time based on the following papers. Please note that the company's estimate above is based on various assumptions and beliefs stated herein, including the available dose window, disregard certain significant conditions such as the eligibility of the patients and may not be supported by any clinical data;

Tong et al. (2012), "Times From Symptom Onset to Hospital Arrival in the Get With The Guidelines–Stroke Program 2002 to 2009"

Harraf (2002), "A multicenter observational study of presentation and early assessment of acute stroke" Kim (2011), "Stroke awareness decreases prehospital delay after acute ischemic stroke in Korea" Matsuo (2017), "Association Between Onset-to-Door Time and Clinical Outcomes After Ischemic Stroke" (Prehospital Time)

23

- 2. Expantion of time window over 12 hours (maximum 24 hours) is based on the registered and published information by Biogen on ClinicalTrials.gov on March 10, 2023.
- 3. Assuming 1 hour needed to decide a treatment option after arriving at a hospital



#### How t-PA is treated for patients arriving within 2 hours from symptom onset <sup>1</sup>

- Due to its high safety profile, TMS-007 has a potential to expand its penetration
- It is estimated that TMS-007 may be used for <u>up to 75%</u> of patients, within the dosing window



# TMS-008/009

Acute Kidney Injury and other indications





TMS-008 development is directed to take advantage of its strong anti-inflammatory properties





- 1. Nature Reviews Nephrology volume 16, pages747–764 (2020)
- 2. Adv Chronic Kidney Dis. 2017;24(4):194-204
- 3. Nephron. 2017 ; 137(4):297–301
- 4. Delveinsight, "Acute Kidney Injury Market Insights, Epidemiology, and Market Forecast—2030"
- 5. Perioperative renal protection, Current Opinion in Critical Care December 2021 Volume 27 Issue 6 pages 676-685
- 6. Delveinsight, "Acute Kidney Injury Market Insights, Epidemiology, and Market Forecast—2030"
- 7. 5 European countries includes Germany, France, Italy, Spain, and the UK

High anti-inflammatory and antioxidant activity

mRNA expression (relative to β-actin)

0.18

0.16

0.14

0.12

0.10

0.08

0.06

#### Inflammation-related parameter using AIS model mouse <sup>1</sup>

 One hour after the start of ischemia, 10 mg/kg was administered continuously intravenously for 30 minutes. Brain slices at 24 hours were evaluated by RT-PCR method.

#### Antioxidant activity test <sup>1,2</sup>

 H-ORAC: hydrophilic oxygen radical absorbance capacity method

Mean  $\pm$  SE (N=3)

TNF- $\alpha$ IL-1 $\beta$ IL-6 6.0 0.7 0.25 5.0 0.6 0.20 nol TE/mol 4.0 0.5 0.15 0.4 3.0 0.3 0.10 2.0 0.2 0.05 1.0 0.1

Mean  $\pm$  SE (N=6)

1. SourceEuropean Journal of Pharmacology Volume 818, 5 January 2018, "Evaluation of the effects of a new series of SMTPs in the acetic acid-induced embolic cerebral infarct mouse model" Publication number : WO 2011/004620

2. Results are shown in Trolox equivalents (TE). α -Tocopherol ORAC Values are for reference (Huang et al., J. Agric. Food Chem., 50, 1815-1821 (2002)).

# TMS-008 Indication: Acute Kidney Injury (AKI)



Preclinical studies in collaboration with Japanese university using AKI mouse models confirmed its potential as a new treatment for AKI

Preclinical studies confirmed efficacy in two animal models, indicating the feasibility of TMS-008 for practical use

 Improvement on Scr (serum creatine) and BUN (blood urea nitrogen), which are parameters of renal function, has been observed

AKI model mouse experiment at Showa University<sup>1</sup>



1. Mean  $\pm$  SE (n = 6), \*p value < 0.05 and \*\*p value < 0.01 as compared with control groups by using ANOVA with Bonferroni correction



TMS-009 showed compelling potential as an anti-inflammatory agent with strong sEH  $^{\rm 1}$  inhibition observed

TMS-009 is protective of renal function in a mouse model of AKI

- Demonstrated equivalent pharmacological activity as TMS-008 in vitro <sup>2</sup> and in vivo <sup>3</sup> studies
- Designated as a backup clinical candidate by taking advantage of dissimilar chemical structure and safety profile to TMS-008

AKI model mouse experiment at Showa Univ



- 1. sEH refers to soluble epoxide hydrolase
- 2. in vitro refers to a medical experiment which uses human or animal tissue to detect drug responses within the confines of a test tube or laboratory dish
- 3. in vivo refers to a medical experiment that detects drug responses in living organisms or cells, such as a laboratory animal or human

# Expansion of Pipelines





Pursue internal and external paths for pipeline expansion, leveraging knowledge and experience through SMTP compounds development



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Bridge science from Japanese academia to the global market

- Business opportunities through bridging innovative science from local to global market
- Evaluating hundreds of seeds



# Appendix



## **Corporate Profile**



Name	TMS Co., Ltd. (Stock Code: 4891)		History
Established	February 17, 2005	Feb. 2005	TMS Co., Ltd. founded
Closing month Representative Directors	February Takuro Wakabayashi Chief Executive Officer	2005 - 2011	Demonstrated thrombolytic and anti- inflammatory activities of SMTP ameliorate ischemic stroke in pharmacological studies of SMTP
Address	Headquarters: 1-9-11F, Fuchu-cho, Fuchu-shi, Tokyo JAPAN	Nov. 2011	Started IND-enabling study of TMS-007
Business Field	Research and development of drug products	Oct. 2014	Started Phase I clinical trial of TMS-007
Management	Board Member: 6	Oct. 2015	Completed Phase I clinical trial of TMS-007
Number of employee	mber of 14 (as of February 28, 2023)		Started phase IIa clinical trial of TMS-007 for ischemic stroke patients
		Jun. 2018	Option agreement with Biogen on TMS-007

May. 2021

Aug. 2021

Nov. 2022

Biogen exercised an option to acquire TMS-007

Completed phase IIa clinical trial of TMS-007

## **Business Model**





- The basic model is that TMS Co., Ltd. conduct drug development from the discovery and research stage to the early clinical stage in collaboration with research institutions and contracted service providers, and partner with pharmaceutical companies from late development stage to commercialization.
- Depending on the disease area, TMS Co., Ltd. may execute late-stage clinical development, obtaining regulatory approval, and even marketing.

## History of TMS Co., Ltd.



#### SMTP



Stachybotrys Microspora Triprenyl Phenol

A small molecule compound produced by Stachybotrys microspore, a type of fungus



Chief Scientific Officer Worked alongside Dr. Akira Endo for 17 years Succeeded Dr. Endo's lab in 1997

#### Dr. Akira Endo

Distinguished Professor Emeritus of Tokyo University of Agriculture and Technology

Invention of the hyperlipidemia drug statin (HMG-CoA reductase inhibitor), one of the best-selling category of drugs in history.











TMS-007 promotes binding of fibrin to blood  $clots^1$ 



1. Hasumi & Suzuki (2021), "Impact of SMTP Targeting Plasminogen and Soluble Epoxide Hydrolase on Thrombolysis, Inflammation, and Ischemic Stroke" Diagrams shown above have been modified by the Company from the original versions. For illustrative purposes only



