Clinical trial results:
Effects of add-on Celecoxib treatment in patients with schizophrenia spectrum disorders and inflammatory cytokine profile (TargetFlame)

Summary

EudraCT number	2021-002572-39
Trial protocol	DE
Global end of trial date	07 January 2026

Results information

Result version number	v1 (current)
This version publication date	13 February 2026
First version publication date	13 February 2026
Summary attachment (see zip file)	CSR_TargetFlame 1.0 (TargetFlame_CSR_V_1.0_20260107.pdf)

Trial information

Trial identification

Sponsor protocol code	TargetFlame

Additional study identifiers

ISRCTN number	-
ClinicalTrials.gov id (NCT number)	-
WHO universal trial number (UTN)	-
Other trial identifiers	PMID: 36401749, PMCID: PMC10374797, DOI: 10.1007/s00702-022-02566-6, DRKS : DRKS00029044

Notes:

Sponsors

Sponsor organisation name	Bezirkskliniken Schwaben
Sponsor organisation address	Geschwister-Schönert-Straße 4, München, Germany, 86156
Public contact	Dr. med. Christiane Blankenstein, TUM School of Medicine and Health Münchner Studienzentrum, 0049 8941406320, christiane.blankenstein@mri.tum.de
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Notes:

Paediatric regulatory details

Is trial part of an agreed paediatric investigation plan (PIP)	No
Does article 45 of REGULATION (EC) No 1901/2006 apply to this trial?	No
Does article 46 of REGULATION (EC) No 1901/2006 apply to this trial?	No

Notes:

Results analysis stage

Analysis stage	Final
Date of interim/final analysis	04 December 2025
Is this the analysis of the primary completion data?	Yes
Primary completion date	04 December 2025
Global end of trial reached?	Yes
Global end of trial date	07 January 2026
Was the trial ended prematurely?	No

Notes:

General information about the trial

Main objective of the trial:

The primary objective is to investigate improvements in psychopathology in patients with schizophrenia spectrum disorders having an inflammatory blood profile randomized to either Celecoxib or placebo

Protection of trial subjects:

The safety, rights and well-being of subjects with schizophrenia are protected in accordance with the Declaration of Helsinki and ICH-GCP.
Written informed consent is obtained prior to any trial-related procedures. The capacity to provide informed consent is assessed by qualified study physicians; involvement of a legally authorised representative is ensured where required by national law.
Only clinically stable patients are included. Subjects with acute psychotic exacerbation or other conditions that may compromise safety or compliance are excluded.
To minimise distress, study visits are aligned with routine psychiatric care whenever possible and conducted by trained staff experienced in the treatment of patients with severe mental disorders. The number and invasiveness of procedures are limited to the minimum necessary.
Subjects are regulary monitored for psychiatric symptoms, suicidality and treatment-emergent adverse events. Any deterioration in mental status leads to immediate clinical evaluation and, if required, discontinuation of the investigational medicinal product and initiation of appropriate medical care.
All adverse events are documented, assessed and reported according to regulatory requirements. A predefined risk management and emergency procedure is in place.
Confidentiality is ensured through pseudonymisation and restricted access to data. Subjects may withdraw consent at any time without disadvantage for further medical care. The protocol and all subject-related documents were approved by an independent Ethics Committee prior to trial start.

Background therapy:

Standard of care

Evidence for comparator: -

Actual start date of recruitment	29 July 2022
Long term follow-up planned	No
Independent data monitoring committee (IDMC) involvement?	Yes

Notes:

Population of trial subjects

Subjects enrolled per country

Country: Number of subjects enrolled	Germany: 30
Worldwide total number of subjects	30
EEA total number of subjects	30

Notes:

Subjects enrolled per age group	
In utero	0
Preterm newborn - gestational age < 37 wk	0
Newborns (0-27 days)	0
Infants and toddlers (28 days-23 months)	0
Children (2-11 years)	0
Adolescents (12-17 years)	0
Adults (18-64 years)	30
From 65 to 84 years	0
85 years and over	0

Subject disposition

Recruitment

Recruitment details:

The multicentre, randomized, double-blind, placebo-controlled, parallel group clinical trial was conducted in Germany at two sites. Between July 2022 and Nov. 2024 all pro-inflammatory patients were randomised in one of the two arms. A randomization did not take place until a final check conforms that all inclusion or no exclusion criteria applied.

Pre-assignment

Screening details:

Pre-screening was conducted. Approximately 199 patients with schizophrenia spectrum disorders were planned for screening, including cytokine profiling and somatic exclusion. Patients with an inflamed profile (n=109 planned) are randomized to add-on Celecoxib or placebo. Screening (Day -21 to -1) followed written informed consent.

Period 1

Period 1 title	Overall trial (overall period)
Is this the baseline period?	Yes
Allocation method	Randomised - controlled
Blinding used	Double blind
Roles blinded	Subject, Investigator, Monitor, Data analyst, Carer

Blinding implementation details:

Study medication (Celecoxib or placebo) is identical in appearance and centrally labelled and dispensed by the pharmacy according to the randomization list. Treatment allocation is concealed from participants, investigators and study staff. Emergency unblinding is permitted only if medically required.

Arms

Are arms mutually exclusive?	Yes
Arm title	Inflamed Patients - Add-on Celecoxib

Arm description:

Patients with schizophrenia spectrum disorders and a confirmed pro-inflammatory cytokine profile receive for 8 weeks (56 days) add-on Celecoxib in addition to standard antipsychotic treatment.

Arm type	Active comparator
Investigational medicinal product name	Celecoxib
Investigational medicinal product code	SUB01143MIG
Other name	CAS number 169590-42-5,
Pharmaceutical forms	Capsule, hard
Routes of administration	Oral use

Dosage and administration details:

Celecoxib is administered orally at a total daily dose of 400 mg, given as 200 mg twice daily (morning and evening before meals) for 8 weeks (56 days).

Arm title	Inflamed Patients - Add-on Placebo

Arm description:

Patients with schizophrenia spectrum disorders and a confirmed pro-inflammatory (“inflamed”) cytokine profile receive add-on placebo in addition to stable standard antipsychotic treatment. Placebo is administered orally twice daily (morning and evening before meals) for 8 weeks (56 days) in a schedule identical to Celecoxib.

Arm type	Placebo
Investigational medicinal product name	Placebo
Investigational medicinal product code	Placebo
Other name	
Pharmaceutical forms	Capsule, hard
Routes of administration	Oral use

Dosage and administration details:

Placebo is administered orally twice daily (morning and evening before meals) for 8 weeks (56 days), following a schedule identical to the active treatment arm.

Number of subjects in period 1	Inflamed Patients - Add-on Celecoxib	Inflamed Patients - Add-on Placebo
Started	15	15
Completed	12	13
Not completed	3	2
incompliance to IMP intake	3	2

Baseline characteristics

Reporting groups	
Reporting group title	Inflamed Patients - Add-on Celecoxib
Reporting group description:	
Patients with schizophrenia spectrum disorders and a confirmed pro-inflammatory cytokine profile receive for 8 weeks (56 days) add-on Celecoxib in addition to standard antipsychotic treatment.	
Reporting group title	Inflamed Patients - Add-on Placebo
Reporting group description:	
Patients with schizophrenia spectrum disorders and a confirmed pro-inflammatory ("inflamed") cytokine profile receive add-on placebo in addition to stable standard antipsychotic treatment. Placebo is administered orally twice daily (morning and evening before meals) for 8 weeks (56 days) in a schedule identical to Celecoxib.	

Reporting group values	Inflamed Patients - Add-on Celecoxib	Inflamed Patients - Add-on Placebo	Total
Number of subjects	15	15	30
Age categorical			
Age descriptes: range between 18 and 65 years			
Units: Subjects			
In utero	0	0	0
Preterm newborn infants (gestational age < 37 wks)	0	0	0
Newborns (0-27 days)	0	0	0
Infants and toddlers (28 days-23 months)	0	0	0
Children (2-11 years)	0	0	0
Adolescents (12-17 years)	0	0	0
Adults (18-64 years)	15	15	30
From 65-84 years	0	0	0
85 years and over	0	0	0
Gender categorical			
Freqencies of male and female patients - males = , females =			
Units: Subjects			
Female	4	8	12
Male	11	7	18
Sites			
Site frequencies (recruitment)			
Units: Subjects			
BKH Augsburg	8	10	18
LMU Munich	7	5	12
BMI			
Body-Mass-Index			
Units: BMI			
arithmetic mean	29.68	27.40	
standard deviation	± 4.06	± 4.64	-

Subject analysis sets	
Subject analysis set title	ITT
Subject analysis set type	Intention-to-treat

Subject analysis set description:

All randomized patients who received at least one dose of IMP

Subject analysis set title	PP
Subject analysis set type	Per protocol

Subject analysis set description:

The per-protocol (PP) population contains all patients in the ITT population except for those with major protocol violations and those who received per-protocol medication.

Reporting group values	ITT	PP	
Number of subjects	30	23	
Age categorical			
Age descriptes: range between 18 and 65 years			
Units: Subjects			
In utero	0	0	
Preterm newborn infants (gestational age < 37 wks)	0	0	
Newborns (0-27 days)	0	0	
Infants and toddlers (28 days-23 months)	0	0	
Children (2-11 years)	0	0	
Adolescents (12-17 years)	0	0	
Adults (18-64 years)	30	22	
From 65-84 years	0	0	
85 years and over	0	0	
Gender categorical			
Freqencies of male and female patients - males = , females =			
Units: Subjects			
Female	12	12	
Male	18	11	
Sites			
Site frequencies (recruitment)			
Units: Subjects			
BKH Augsburg	18	15	
LMU Munich	12	8	
BMI			
Body-Mass-Index			
Units: BMI			
arithmetic mean	28.55	28.49	
standard deviation	± 4.53	± 4.43	

End points

End points reporting groups

Reporting group title	Inflamed Patients - Add-on Celecoxib
Reporting group description:	
Patients with schizophrenia spectrum disorders and a confirmed pro-inflammatory cytokine profile receive for 8 weeks (56 days) add-on Celecoxib in addition to standard antipsychotic treatment.	
Reporting group title	Inflamed Patients - Add-on Placebo
Reporting group description:	
Patients with schizophrenia spectrum disorders and a confirmed pro-inflammatory ("inflamed") cytokine profile receive add-on placebo in addition to stable standard antipsychotic treatment. Placebo is administered orally twice daily (morning and evening before meals) for 8 weeks (56 days) in a schedule identical to Celecoxib.	
Subject analysis set title	ITT
Subject analysis set type	Intention-to-treat
Subject analysis set description:	
All randomized patients who received at least one dose of IMP	
Subject analysis set title	PP
Subject analysis set type	Per protocol
Subject analysis set description:	
The per-protocol (PP) population contains all patients in the ITT population except for those with major protocol violations and those who received per-protocol medication.	

Primary: Change in symptom severity in randomized patients following treatment with add-on Celecoxib compared to control patients following treatment with add-on placebo as assessed by total PANSS score changes from baseline to two months (56 days) after treatment

End point title	Change in symptom severity in randomized patients following treatment with add-on Celecoxib compared to control patients following treatment with add-on placebo as assessed by total PANSS score changes from baseline to two months (56 days) after treatment
End point description:	
Comparison of the mean change in total PANSS score from baseline to Day 56 between the add-on Celecoxib and add-on placebo groups in randomized patients with an inflamed profile.	
End point type	Primary
End point timeframe:	
Baseline to Day 56 (8 weeks) after treatment initiation.	

End point values	Inflamed Patients - Add-on Celecoxib	Inflamed Patients - Add-on Placebo	ITT	PP
Subject group type	Reporting group	Reporting group	Subject analysis set	Subject analysis set
Number of subjects analysed	15	15	30	23
Units: Scores				
arithmetic mean (standard deviation)				
V1	70.20 (± 14.23)	72.20 (± 10.83)	71.20 (± 12.47)	71.91 (± 11.64)
V3	65.25 (± 19.54)	61.46 (± 7.61)	63.28 (± 14.41)	62.27 (± 13.99)

Statistical analyses

Statistical analysis title	PANSS - primary endpoint
Statistical analysis description: comparison V1 vs V3 with wilcoxon test	
Comparison groups	Inflamed Patients - Add-on Celecoxib v Inflamed Patients - Add-on Placebo
Number of subjects included in analysis	30
Analysis specification	Pre-specified
Analysis type	superiority[1]
P-value	= 0.045 [2]
Method	Wilcoxon (Mann-Whitney)
Parameter estimate	Mean difference (final values)

Notes:

[1] - Wilcoxon test V1 vs V3 for group 1 (celecoxib)

[2] - Wilcoxon test V1 vs V3 for group 1 (celecoxib)

Statistical analysis title	Copy of PANSS - primary endpoint
Statistical analysis description: comparison V1 vs V3 with wilcoxon test	
Comparison groups	Inflamed Patients - Add-on Placebo v Inflamed Patients - Add-on Celecoxib
Number of subjects included in analysis	30
Analysis specification	Pre-specified
Analysis type	superiority[3]
P-value	= 0.003
Method	Wilcoxon (Mann-Whitney)
Parameter estimate	Mean difference (final values)

Notes:

[3] - Wilcoxon test V1 vs V3 for group 2 (placebo)

Secondary: PANSS Positive Score

End point title	PANSS Positive Score
End point description: Comparison of the mean change in PANSS Positve Score from baseline to Day 56 between the add-on Celecoxib and add-on placebo groups in randomized patients with an inflamed profile.	
End point type	Secondary
End point timeframe: Baseline to Day 56 (8 weeks) after treatment initiation.	

End point values	Inflamed Patients - Add-on Celecoxib	Inflamed Patients - Add-on Placebo	ITT	PP
Subject group type	Reporting group	Reporting group	Subject analysis set	Subject analysis set
Number of subjects analysed	15	15	30	23
Units: Score				
arithmetic mean (standard deviation)				
V1	17.80 (± 6.51)	16.13 (± 4.45)	16.97 (± 5.54)	16.65 (± 5.12)
V3	15.17 (± 6.45)	13.62 (± 2.63)	14.36 (± 4.81)	14.05 (± 4.48)

Statistical analyses

No statistical analyses for this end point

Secondary: PANSS Negative Score

End point title	PANSS Negative Score

End point description:

Change in PANSS Negative Score between V1 an V3

End point type	Secondary

End point timeframe:

Baseline to Day 56 (8 weeks) after treatment initiation.

End point values	Inflamed Patients - Add-on Celecoxib	Inflamed Patients - Add-on Placebo	ITT	PP
Subject group type	Reporting group	Reporting group	Subject analysis set	Subject analysis set
Number of subjects analysed	15	15	30	23
Units: Score				
arithmetic mean (standard deviation)				
V1	17.60 (± 5.74)	19.80 (± 5.39)	18.70 (± 5.58)	19.43 (± 5.04)
V3	17.17 (± 4.53)	15.46 (± 4.84)	16.28 (± 4.68)	16.23 (± 4.56)

Statistical analyses

No statistical analyses for this end point

Secondary: Change in GAF-Scores

End point title	Change in GAF-Scores

End point description:

Change in function of the measure of GAF-Score.

End point type	Secondary

End point timeframe:

Baseline to Day 56 (8 weeks) after treatment initiation.

End point values	Inflamed Patients - Add-on Celecoxib	Inflamed Patients - Add-on Placebo	ITT	PP
Subject group type	Reporting group	Reporting group	Subject analysis set	Subject analysis set
Number of subjects analysed	15	15	30	23
Units: Scores				
arithmetic mean (standard deviation)				
V1	50.86 (± 7.65)	47.64 (± 10.99)	49.25 (± 9.43)	48.71 (± 10.35)
V3	55.83 (± 11.36)	50.83 (± 8.82)	53.33 (± 10.27)	54.00 (± 9.80)

Statistical analyses

No statistical analyses for this end point

Adverse events

Adverse events information

Timeframe for reporting adverse events:

Adverse events are assessed and recorded at each study visit from first administration of the investigational medicinal product until the end-of-treatment visit (Day 56 ±7 days).

Adverse event reporting additional description:

Planned hospitalizations (pre-existing conditions or protocol-required procedures without serious deterioration), admissions for social reasons, and surgeries planned before trial entry are not considered SAEs. Re-hospitalization between V3 and V5 for psychiatric reasons is also not classified as an SAE.

Assessment type	Systematic

Dictionary used

Dictionary name	MedDRA
Dictionary version	28.0

Reporting groups

Reporting group title	Overall Study

Reporting group description:

The safety set consisted of all patients who entered the trial and was used for conducting all safety analyses.

Serious adverse events	Overall Study		
Total subjects affected by serious adverse events			
subjects affected / exposed	1 / 30 (3.33%)		
number of deaths (all causes)	0		
number of deaths resulting from adverse events	0		
Psychiatric disorders			
Schizoaffective disorder			
alternative dictionary used: MedDRA 27.1			
subjects affected / exposed	1 / 30 (3.33%)		
occurrences causally related to treatment / all	0 / 1		
deaths causally related to treatment / all	0 / 0		

Frequency threshold for reporting non-serious adverse events: 5 %

Non-serious adverse events	Overall Study		
Total subjects affected by non-serious adverse events			
subjects affected / exposed	16 / 30 (53.33%)		
Investigations			
Weight increased			

subjects affected / exposed occurrences (all)	4 / 30 (13.33%) 4		
Nervous system disorders Dizziness subjects affected / exposed occurrences (all)	 2 / 30 (6.67%) 2		
Gastrointestinal disorders Abdominal pain upper subjects affected / exposed occurrences (all) Dyspepsia subjects affected / exposed occurrences (all) Nausea subjects affected / exposed occurrences (all)	 2 / 30 (6.67%) 2 2 / 30 (6.67%) 2 2 / 30 (6.67%) 2		
Psychiatric disorders Depression subjects affected / exposed occurrences (all) Restlessness subjects affected / exposed occurrences (all)	 2 / 30 (6.67%) 2 2 / 30 (6.67%) 2		

More information

Substantial protocol amendments (globally)

Were there any global substantial amendments to the protocol? Yes

Date	Amendment
20 September 2023	The following major changes were included in AM 1: The CSP was adapted due to further development of the algorithm for differentiation between inflamed/non-inflamed patients; change of investigator at trial site #2.
11 December 2024	The following major changes were included in AM 2: Deletion of follow-up visits (V4 and V5) post intervention.

Notes:

Interruptions (globally)

Were there any global interruptions to the trial? No

Limitations and caveats

None reported

Online references

http://www.ncbi.nlm.nih.gov/pubmed/36401749