



Clinical trial results:

A prospective phase I/II study to investigate the feasibility, safety and efficacy of IL-15 activated cytokine induced killer (CIK) cells in relapsing patients with acute leukemia or myelodysplastic syndromes after allogeneic stem cell transplantation

Summary

EudraCT number	2013-005446-11
Trial protocol	DE
Global end of trial date	21 July 2023

Results information

Result version number	v1 (current)
This version publication date	29 May 2026
First version publication date	29 May 2026

Trial information

Trial identification

Sponsor protocol code	FFM-CIK-CellStudy01
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Additional study identifiers

ISRCTN number	-
ClinicalTrials.gov id (NCT number)	-
WHO universal trial number (UTN)	-

Notes:

Sponsors

Sponsor organisation name	Goethe-Universität Frankfurt
Sponsor organisation address	Theodor-Stern-Kai 7, Frankfurt, Germany, 60590
Public contact	Division of Stem Cell Transplantation and Immunology, Department of Pediatrics, Goethe-University Frankfurt, eva.rettinger@icloud.com
Scientific contact	Division of Stem Cell Transplantation and Immunology, Department of Pediatrics, Goethe-University Frankfurt, eva.rettinger@icloud.com

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	14 September 2021
Is this the analysis of the primary completion data?	Yes
Primary completion date	14 September 2021
Global end of trial reached?	Yes
Global end of trial date	21 July 2023
Was the trial ended prematurely?	No

Notes:

General information about the trial

Main objective of the trial:

To assess the safety and feasibility of increasing cell doses of CIK cell transfusions in adult and pediatric leukemia and MDS patients with molecular, cytogenetic or hematologic relapse after allogeneic SCT.

Protection of trial subjects:

IL15-CIK infusions were administered at "safety" intervals of 4-6 weeks, without the use of preconditioning or lymphodepletion. The starting dose was 1.0×10^6 CD3CD56⁺ cells/kg, with escalation to 5.0×10^6 , 1.0×10^7 , and up to 1.0×10^8 cells/kg based on MRD status and absence of new or worsening aGvHD (to protect trial subjects).

Background therapy: -

Evidence for comparator: -

Actual start date of recruitment	24 March 2016
Long term follow-up planned	No
Independent data monitoring committee (IDMC) involvement?	No

Notes:

Population of trial subjects

Subjects enrolled per country

Country: Number of subjects enrolled	Germany: 17
Worldwide total number of subjects	17
EEA total number of subjects	17

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)	10
Adolescents (12-17 years)	2
Adults (18-64 years)	1

From 65 to 84 years	4
85 years and over	0

Subject disposition

Recruitment

Recruitment details:

Eligible patients were children and adults (aged >1–<80 years) with HR hematological malignancies who had undergone HCT. Inclusion required relapse >120 days post-transplant, reappearance of MRD, cytogenetic abnormalities, or MC (mixed chimersim).

Pre-assignment

Screening details:

Eligible patients were children and adults (aged >1–<80 years) with HR hematological malignancies who had undergone HCT. Inclusion required relapse >120 days post-transplant, reappearance of MRD, cytogenetic abnormalities, or MC (mixed chimersim).

Period 1

Period 1 title	overall trial (overall period)
Is this the baseline period?	Yes
Allocation method	Not applicable
Blinding used	Not blinded

Arms

Arm title	CIK intervention
Arm description: -	
Arm type	Experimental
Investigational medicinal product name	CIK cells
Investigational medicinal product code	IL-15
Other name	
Pharmaceutical forms	Injection/infusion
Routes of administration	Infusion

Dosage and administration details:

Starting dose of 1x10⁶ CD3+CD56- CIK cells/kg recipient body weight will be increased in intervals of 4–6 weeks to 5x10⁶ CD3+CD56-, and 1x10⁷ CD3+CD56- CIK cells/kg. CIK cell dose may be increased to 5x10⁷ CD3+CD56- CIK cells/kg and 1x10⁸ CD3+CD56- CIK cells/kg in pediatric patients with HLA-matched CIK cell infusions and completed T cell reconstitution only, who remained without any signs of aGvHD after a minimum of four CIK cell treatments. Patients will be screened for relapse and signs of GvHD according to GSC. Patients who experience disease progression or < grade II aGvHD may receive modified CIK cell doses. No further CIK cell infusions will be administered in the presence of aGvHD ≥ grade II.

Number of subjects in period 1	CIK intervention
Started	17
Completed	17

Baseline characteristics

Reporting groups

Reporting group title	overall trial
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Reporting group description: -

Reporting group values	overall trial	Total	
Number of subjects	17	17	
Age categorical			
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)	10	10	
Adolescents (12-17 years)	2	2	
Adults (18-64 years)	1	1	
From 65-84 years	4	4	
85 years and over	0	0	
Age continuous			
Units: years			
median	8.3		
full range (min-max)	3.6 to 71.9	-	
Gender categorical			
Units: Subjects			
Female	6	6	
Male	11	11	
Diagnosis			
Units: Subjects			
B-ALL	5	5	
AML	10	10	
CMMML	1	1	
MDS	1	1	
Number of SCTs			
Units: Subjects			
One	14	14	
Two	3	3	
Remission before SCT			
Units: Subjects			
CR1	8	8	
CR2	5	5	
>CR2	3	3	
NR	1	1	
Donor			
Units: Subjects			
MSD	1	1	
MUD	12	12	

MMFD	3	3	
MMUD	1	1	
Stem cell source Units: Subjects			
BM	9	9	
PBSC	8	8	
T cell depletion (SCT) Units: Subjects			
No	13	13	
Yes	4	4	
Serotherapy Units: Subjects			
ATG	11	11	
Campath	5	5	
No serotherapy	1	1	
Number of CIK cell administrations Units: Subjects			
One	5	5	
Two	4	4	
Three	1	1	
Four	4	4	
Five	2	2	
Six	0	0	
Seven	0	0	
Eight	1	1	
Age Units: year			
median	8.3		
full range (min-max)	3.6 to 71.9	-	
CD34+ (SCT) Units: 10 ⁶ /kg			
median	7.1		
full range (min-max)	1.7 to 40.0	-	
CD3+ (SCT) Units: 10 ⁶ /kg			
median	24.9		
full range (min-max)	0.0 to 107.3	-	
ATG dose (SCT) Units: mg/kg			
median	60.9		
full range (min-max)	27.7 to 83.6	-	
Campath dose (SCT) Units: mg/kg			
median	1.3		
full range (min-max)	0.4 to 2.0	-	
Duration from SCT to first CIK infusion Units: month			
median	6.2		
full range (min-max)	1.4 to 17.8	-	
Cumulative CIK cell dose Units: 10 ⁶ /kg			

median	6.1		
full range (min-max)	1.0 to 190.7	-	
Maximum CIK cell dose			
Units: 10 ⁶ /kg			
median	5.1		
full range (min-max)	1.0 to 100.0	-	

Subject analysis sets

Subject analysis set title	all subjects
Subject analysis set type	Per protocol

Subject analysis set description:

Full analysis set.

Reporting group values	all subjects		
Number of subjects	17		
Age categorical			
Units: Subjects			
In utero	0		
Preterm newborn infants (gestational age < 37 wks)	0		
Newborns (0-27 days)	0		
Infants and toddlers (28 days-23 months)	0		
Children (2-11 years)	10		
Adolescents (12-17 years)	2		
Adults (18-64 years)	1		
From 65-84 years	4		
85 years and over	0		
Age continuous			
Units: years			
median	8.3		
full range (min-max)	3.6 to 71.9		
Gender categorical			
Units: Subjects			
Female	6		
Male	11		
Diagnosis			
Units: Subjects			
B-ALL	5		
AML	10		
CMML	1		
MDS	1		
Number of SCTs			
Units: Subjects			
One	14		
Two	3		
Remission before SCT			
Units: Subjects			
CR1	8		
CR2	5		
>CR2	3		

NR	1		
Donor			
Units: Subjects			
MSD	1		
MUD	12		
MMFD	3		
MMUD	1		
Stem cell source			
Units: Subjects			
BM	9		
PBSC	8		
T cell depletion (SCT)			
Units: Subjects			
No	13		
Yes	4		
Serotherapy			
Units: Subjects			
ATG	11		
Campath	5		
No serotherapy	1		
Number of CIK cell administrations			
Units: Subjects			
One	5		
Two	4		
Three	1		
Four	4		
Five	2		
Six	0		
Seven	0		
Eight	1		
Age			
Units: year			
median	8.3		
full range (min-max)	3.6 to 71.9		
CD34+ (SCT)			
Units: 10 ⁶ /kg			
median	7.1		
full range (min-max)	1.7 to 40.0		
CD3+ (SCT)			
Units: 10 ⁶ /kg			
median	24.9		
full range (min-max)	0.0 to 107.3		
ATG dose (SCT)			
Units: mg/kg			
median	60.9		
full range (min-max)	27.7 to 83.6		
Campath dose (SCT)			
Units: mg/kg			
median	1.3		
full range (min-max)	0.4 to 2.0		
Duration from SCT to first CIK infusion			

Units: month median full range (min-max)	6.2 1.4 to 17.8		
Cumulative CIK cell dose Units: 10 ⁶ /kg median full range (min-max)	6.1 1.0 to 190.7		
Maximum CIK cell dose Units: 10 ⁶ /kg median full range (min-max)	5.1 1.0 to 100.0		

End points

End points reporting groups

Reporting group title	CIK intervention
Reporting group description: -	
Subject analysis set title	all subjects
Subject analysis set type	Per protocol
Subject analysis set description:	
Full analysis set.	

Primary: Grade III or IV aGvHD or extensive cGvHD

End point title	Grade III or IV aGvHD or extensive cGvHD ^[1]
End point description:	
Incidence of Grade III or IV aGvHD or extensive cGvHD	
End point type	Primary
End point timeframe:	
From start of IL-15 CIK treatment to end of study	

Notes:

[1] - No statistical analyses have been specified for this primary end point. It is expected there is at least one statistical analysis for each primary end point.

Justification: To assess dose-limiting toxicity the number of adverse events is too small (n=1).

End point values	CIK intervention	all subjects		
Subject group type	Reporting group	Subject analysis set		
Number of subjects analysed	17	17		
Units: Subjects	1	1		

Statistical analyses

No statistical analyses for this end point

Secondary: Toxicity - aGvHD

End point title	Toxicity - aGvHD
End point description:	
Incidence and severity of aGvHD	
End point type	Secondary
End point timeframe:	
From start of IL-15 CIK treatment to end of study	

End point values	CIK intervention	all subjects		
Subject group type	Reporting group	Subject analysis set		
Number of subjects analysed	17	17		
Units: Subjects				
No aGvHD	7	7		
Grade 1 aGvHD	5	5		
Grade 2 aGvHD	4	4		
Grade 3 aGvHD	1	1		
Grade 4 aGvHD	0	0		

Statistical analyses

No statistical analyses for this end point

Secondary: Toxicity - cGvHD

End point title	Toxicity - cGvHD
End point description:	
Incidence and severity of cGvHD	
End point type	Secondary
End point timeframe:	
From start of IL-15 CIK treatment to end of study	

End point values	CIK intervention	all subjects		
Subject group type	Reporting group	Subject analysis set		
Number of subjects analysed	17	17		
Units: Subjects				
No cGvHD	15	15		
Limited cGvHD	2	2		
Extensive cGvHD	0	0		

Statistical analyses

No statistical analyses for this end point

Secondary: Feasibility – manufactured batches

End point title	Feasibility – manufactured batches
End point description:	
Number of successfully manufactured IL-15 CIK batches	
End point type	Secondary
End point timeframe:	
From start of IL-15 CIK treatment to end of study	

End point values	CIK intervention	all subjects		
Subject group type	Reporting group	Subject analysis set		
Number of subjects analysed	17	17		
Units: Subjects				
Manufacturing of IL-15 CIK batch successful	17	17		
Manufacturing of IL-15 CIK batch not successful	0	0		

Statistical analyses

No statistical analyses for this end point

Secondary: Feasibility – Time from request to release

End point title	Feasibility – Time from request to release
End point description:	
Time from request to release of IL-15 CIK batches	
End point type	Secondary
End point timeframe:	
From start of IL-15 CIK treatment to end of study	

End point values	CIK intervention	all subjects		
Subject group type	Reporting group	Subject analysis set		
Number of subjects analysed	14	14		
Units: day				
median (full range (min-max))	20 (10 to 42)	20 (10 to 42)		

Statistical analyses

No statistical analyses for this end point

Secondary: Response

End point title	Response
End point description:	
Response evaluated on day 100 after first IL-15 CIK infusion	
End point type	Secondary
End point timeframe:	
From start of IL-15 CIK treatment to end of study	

End point values	CIK intervention	all subjects		
Subject group type	Reporting group	Subject analysis set		
Number of subjects analysed	17	17		
Units: Subjects				
Complete molecular remission	7	7		
Complete remission	7	7		
Alive in relapse	2	2		
Death due to relapse	0	0		
NRM	1	1		

Statistical analyses

No statistical analyses for this end point

Secondary: Tumor escape mechanisms

End point title	Tumor escape mechanisms
End point description:	Incidence of relapse before achieving a complete molecular remission and before suffering from NRM
End point type	Secondary
End point timeframe:	From start of IL-15 CIK treatment to end of study

End point values	CIK intervention	all subjects		
Subject group type	Reporting group	Subject analysis set		
Number of subjects analysed	17	17		
Units: Subjects				
Relapse	4	4		

Statistical analyses

No statistical analyses for this end point

Secondary: Overall Survival at 6 years

End point title	Overall Survival at 6 years
End point description:	
End point type	Secondary
End point timeframe:	From start of IL-15 CIK treatment until, death, loss to follow-up or end of study.

End point values	CIK intervention	all subjects		
Subject group type	Reporting group	Subject analysis set		
Number of subjects analysed	17	17		
Units: percent				
number (confidence interval 95%)	68.0 (38.4 to 85.6)	68.0 (38.4 to 85.6)		

Statistical analyses

No statistical analyses for this end point

Secondary: Progression free Survival at 6 years

End point title	Progression free Survival at 6 years
End point description: Time to disease progression or death from any cause, whichever occurred first. Censoring at subsequent HSCT, loss to follow-up or end of study.	
End point type	Secondary
End point timeframe: From start of IL-15 CIK treatment until progression, death, subsequent HSCT, loss to follow-up or end of study.	

End point values	CIK intervention	all subjects		
Subject group type	Reporting group	Subject analysis set		
Number of subjects analysed	17	17		
Units: percent				
number (confidence interval 95%)	56.6 (29.6 to 76.7)	56.6 (29.6 to 76.7)		

Statistical analyses

No statistical analyses for this end point

Adverse events

Adverse events information

Timeframe for reporting adverse events:

From first treatment to 12 months after last CIK cell infusion.

Assessment type	Systematic
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Dictionary used

Dictionary name	MedDRA
Dictionary version	4.0

Reporting groups

Reporting group title	all subjects
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Reporting group description: -

Serious adverse events	all subjects		
Total subjects affected by serious adverse events			
subjects affected / exposed	2 / 17 (11.76%)		
number of deaths (all causes)	5		
number of deaths resulting from adverse events	1		
Respiratory, thoracic and mediastinal disorders			
Progressive lung infiltration			
subjects affected / exposed	1 / 17 (5.88%)		
occurrences causally related to treatment / all	0 / 1		
deaths causally related to treatment / all	0 / 1		
Infections and infestations			
CMV reactivation			
subjects affected / exposed	1 / 17 (5.88%)		
occurrences causally related to treatment / all	0 / 1		
deaths causally related to treatment / all	0 / 0		

Frequency threshold for reporting non-serious adverse events: 0 %

Non-serious adverse events	all subjects		
Total subjects affected by non-serious adverse events			
subjects affected / exposed	4 / 17 (23.53%)		
Immune system disorders			

Cytokine release syndrome subjects affected / exposed occurrences (all)	1 / 17 (5.88%) 1		
Skin and subcutaneous tissue disorders Atopic eczema subjects affected / exposed occurrences (all)	1 / 17 (5.88%) 1		
Musculoskeletal and connective tissue disorders Osteomyelitis subjects affected / exposed occurrences (all)	1 / 17 (5.88%) 1		
Infections and infestations Influenza subjects affected / exposed occurrences (all)	1 / 17 (5.88%) 1		

More information

Substantial protocol amendments (globally)

Were there any global substantial amendments to the protocol? No

Interruptions (globally)

Were there any global interruptions to the trial? No

Limitations and caveats

None reported