Clinical trial results:
A Phase 1/2, Open-label, Multicenter, Non-randomized Study to Assess the Safety, Tolerability, Pharmacokinetics and Efficacy of Burosumab in Pediatric Patients from Birth to Less than 1 Year of Age with X-linked Hypophosphatemia (XLH)

Summary

EudraCT number	2019-000469-19
Trial protocol	GB FR DE SE AT IT
Global end of trial date	04 October 2023

Results information

Result version number	v1 (current)
This version publication date	20 April 2024
First version publication date	20 April 2024

Trial information

Trial identification

Sponsor protocol code	BUR-CL207

Additional study identifiers

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

Notes:

Sponsors

Sponsor organisation name	Kyowa Kirin Pharmaceutical Development Ltd
Sponsor organisation address	Galabank Business Park, London, United Kingdom, TD1 1QH
Public contact	Kyowa Kirin Pharmaceutical Development Ltd, Kyowa Kirin Pharmaceutical Development Ltd, kkd.clintrial.82@kyowakirin.com
Scientific contact	Kyowa Kirin Pharmaceutical Development Ltd, Kyowa Kirin Pharmaceutical Development Ltd, kkd.clintrial.82@kyowakirin.com

Notes:

Paediatric regulatory details

Is trial part of an agreed paediatric investigation plan (PIP)	Yes
EMA paediatric investigation plan number(s)	EMEA-001659-PIP01-15
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?	Yes

Notes:

Results analysis stage

Analysis stage	Final
Date of interim/final analysis	05 March 2024
Is this the analysis of the primary completion data?	Yes
Primary completion date	04 October 2023
Global end of trial reached?	Yes
Global end of trial date	04 October 2023
Was the trial ended prematurely?	No

Notes:

General information about the trial

Main objective of the trial:

To assess the safety and tolerability of burosumab in pediatric subjects with X-linked Hypophosphatemia (XLH)
starting treatment below 12 months of age with up to 48 weeks of exposure.

Protection of trial subjects:

This protocol is written in accordance with the principles established by the 18th World Medical General Assembly(Helsinki, 1964) and subsequent amendments and clarifications adopted by the general assemblies. The Sponsor and the investigators will make every effort to assure the study described in the protocol is conducted in full conformance with those principles, current Food and Drug Administration (FDA) regulations, ICH Good Clinical Practices (GCP) guidelines and local ethical and regulatory requirements. The investigator will also make sure he or she is thoroughly familiar with the appropriate administration and potential risks of administration of the study drug as described in the protocol and investigational brochure, prior to the imitation of the study. It is the investigators responsibility to obtain signed written consent from each potential study subject legal representative prior to conduct of any study procedures. The written informed consent will be obtained after the methods, objectives, requirements and potential risks of the study have been fully explained to each potential subject. The investigator must explain to each subject what the subject is completely free to refuse to enter the study or to withdraw from it at any time.

Background therapy: -

Evidence for comparator: -

Actual start date of recruitment	06 March 2020
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	Spain: 2
Country: Number of subjects enrolled	United Kingdom: 4
Country: Number of subjects enrolled	Austria: 1
Country: Number of subjects enrolled	France: 6
Country: Number of subjects enrolled	Italy: 3
Worldwide total number of subjects	16
EEA total number of subjects	12

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)	16
Children (2-11 years)	0
Adolescents (12-17 years)	0
Adults (18-64 years)	0
From 65 to 84 years	0
85 years and over	0

Subject disposition

Recruitment

Recruitment details:

Pediatric XLH patients under 1 year at initiation of treatment with burosumab, with serum phosphate below the lower limit of normal as assessed by local labs

Pre-assignment

Screening details:

Screening visit could occur up to 4 weeks before the baseline visit and could be split into two visits if required. Informed consent, Inclusion/Exclusion criteria, medical history, demographics, vital signs and weight, local and central labs were collected as well as renal ultrasound.

Period 1

Period 1 title	Overall trial (overall period)
Is this the baseline period?	Yes
Allocation method	Non-randomised - controlled
Blinding used	Not blinded

Arms

Are arms mutually exclusive?	Yes
Arm title	Cohort 1

Arm description:

Subjects aged between 6 months and 1 year on a starting dose of 0.4mg/kg.

Arm type	Experimental
Investigational medicinal product name	Burosumab
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Injection
Routes of administration	Subcutaneous use

Dosage and administration details:

Burosumab is a sterile clear, colorless and preservative-free solutions supplied in a single use 5ml vial containing 1ml of burosumab at a concentration of 10 mg/ml, 20 mg/ml and 30 mg/ml. Burosumab was administered Q2W as a subcutaneous injection with a maximum volume of 1ml per injection site. Burosumab dose was calculated on actual body weight. The administered dose may be rounded based on the estimated volume to be drawn for administration (rounding up to nearest 1ml). Dose increases were allowed in 0.4mg/kg increases up
to a maximum dose of 2mg/kg upon agreement with sponsors medical monitor and the chairperson of the data safety monitoring board. Burosumab dosing will be adjusted based on the pharmacodynamic response based on serum phosphate levels

Arm title	Cohort 2

Arm description:

Subjects aged between 6 months and 1 year at initiation of treatment with burosumab at a starting dose of 0.8mg/kg

Arm type	Experimental
Investigational medicinal product name	Burosumab
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Injection
Routes of administration	Subcutaneous use

Dosage and administration details:

Burosumab is a sterile clear, colorless and preservative-free solutions supplied in a single use 5ml vial containing 1ml of burosumab at a concentration of 10 mg/ml, 20 mg/ml and 30 mg/ml. Burosumab was administered Q2W as a subcutaneous injection with a maximum volume of 1ml per injection site. Burosumab dose was calculated on actual body weight. The administered dose may be rounded based on the estimated volume to be drawn for administration (rounding up to nearest 1ml). Dose increases

were allowed in 0.4mg/kg increases up to a maximum dose of 2mg/kg upon agreement with sponsors medical monitor and the chairperson of the data safety monitoring board. Burosumab dosing will be adjusted based on the pharmacodynamic response based on serum phosphate levels

Arm title	Cohort 3
Arm description:	
Subjects under 6 months of age at initiation of burosumab with a starting dose of 0.4mg/kg	
Arm type	Experimental
Investigational medicinal product name	Burosumab
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Injection
Routes of administration	Subcutaneous use

Dosage and administration details:

Burosumab is a sterile clear, colorless and preservative-free solutions supplied in a single use 5ml vial containing 1ml of burosumab at a concentration of 10 mg/ml, 20 mg/ml and 30 mg/ml. Burosumab was administered Q2W as a subcutaneous injection with a maximum volume of 1ml per injection site. Burosumab dose was calculated on actual body weight. The administered dose may be rounded based on the estimated volume to be drawn for administration (rounding up to nearest 1ml). Dose increases were allowed in 0.4mg/kg increases up to a maximum dose of 2mg/kg upon agreement with sponsors medical monitor and the chairperson of the data safety monitoring board. Burosumab dosing will be adjusted based on the pharmacodynamic response based on serum phosphate levels

Number of subjects in period 1	Cohort 1	Cohort 2	Cohort 3
Started	3	9	4
Completed	3	8	4
Not completed	0	1	0
Consent withdrawn by subject	-	1	-

Baseline characteristics

Reporting groups	
Reporting group title	Cohort 1
Reporting group description:	
Subjects aged between 6 months and 1 year on a starting dose of 0.4mg/kg.	
Reporting group title	Cohort 2
Reporting group description:	
Subjects aged between 6 months and 1 year at initiation of treatment with burosumab at a starting dose of 0.8mg/kg	
Reporting group title	Cohort 3
Reporting group description:	
Subjects under 6 months of age at initiation of burosumab with a starting dose of 0.4mg/kg	

Reporting group values	Cohort 1	Cohort 2	Cohort 3
Number of subjects	3	9	4
Age categorical 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)	3	9	4
Children (2-11 years)	0	0	0
Adolescents (12-17 years)	0	0	0
Adults (18-64 years)	0	0	0
From 65-84 years	0	0	0
85 years and over	0	0	0
Gender categorical Units: Subjects			
Female	1	4	2
Male	2	5	2

Reporting group values	Total		
Number of subjects	16		
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)	16		
Children (2-11 years)	0		
Adolescents (12-17 years)	0		
Adults (18-64 years)	0		
From 65-84 years	0		
85 years and over	0		

Gender categorical Units: Subjects			
Female	7		
Male	9		

End points

End points reporting groups

Reporting group title	Cohort 1
Reporting group description:	
Subjects aged between 6 months and 1 year on a starting dose of 0.4mg/kg.	
Reporting group title	Cohort 2
Reporting group description:	
Subjects aged between 6 months and 1 year at initiation of treatment with burosumab at a starting dose of 0.8mg/kg	
Reporting group title	Cohort 3
Reporting group description:	
Subjects under 6 months of age at initiation of burosumab with a starting dose of 0.4mg/kg	

Primary: Primary

End point title	Primary[1]
End point description:	
Incidence, frequency, and severity of AEs and SAEs, including clinically significant changes in laboratory and imaging assessments, from Baseline to scheduled timepoints (measured throughout the study up to Week 48).	
End point type	Primary
End point timeframe:	
Baseline through to Week 48	

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: The primary objective for this study was to characterize the safety profile of burosumab in pediatric subjects starting treatment from birth to <12 months of age. Accordingly, the primary endpoint of this study was to assess the incidence, frequency, and severity of AEs and SAEs, including clinically significant changes in laboratory and imaging assessments, from Baseline to scheduled timepoints (measured throughout the study up to Week 48).

End point values	Cohort 1	Cohort 2	Cohort 3	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	3	9	4	
Units: Adverse Events	51	93	40	

Statistical analyses

No statistical analyses for this end point

Secondary: To characterize the affect of burosumab on serum phosphate

End point title	To characterize the affect of burosumab on serum phosphate
End point description:	
End point type	Secondary
End point timeframe:	
Change from baseline over time (week 20, week 26, 32, 40 and 48)	

End point values	Cohort 1	Cohort 2	Cohort 3	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	3	8	4	
Units: millimole(s)/litre				
arithmetic mean (standard deviation)	16.875 (± 16.0982)	21.869 (± 14.1200)	13.743 (± 9.4988)	

Statistical analyses

No statistical analyses for this end point

Secondary: Characterize the effect of burosumab on serum 1,25{OH}2D

End point title	Characterize the effect of burosumab on serum 1,25{OH}2D

End point description:

End point type	Secondary

End point timeframe:

Change from baseline to week 20, week 26, week 32, week 40 and week 48

End point values	Cohort 1	Cohort 2	Cohort 3	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	3	7	4	
Units: millimole(s)/litre				
arithmetic mean (standard deviation)	3.67 (± 27.335)	-2.50 (± 55.026)	31.13 (± 44.150)	

Statistical analyses

No statistical analyses for this end point

Secondary: Change overtime in serum ALP

End point title	Change overtime in serum ALP

End point description:

End point type	Secondary

End point timeframe:

Change from Baseline overtime and at week 48

End point values	Cohort 1	Cohort 2	Cohort 3	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	3	8	4	
Units: unit(s) per litre				
arithmetic mean (standard deviation)	151.3 (± 552.81)	-274.5 (± 102.20)	-276.8 (± 169.34)	

Statistical analyses

No statistical analyses for this end point

Secondary: Change in radiographic appearance of rickets severity as assessed by the RGI-C scoring system (global))

End point title	Change in radiographic appearance of rickets severity as assessed by the RGI-C scoring system (global))

End point description:

End point type	Secondary

End point timeframe:

Change in baseline to Week 48

End point values	Cohort 1	Cohort 2	Cohort 3	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	2	9	4	
Units: score on a scale				
arithmetic mean (standard deviation)	1.50 (± 0.707)	2.00 (± 0.0)	1.75 (± 0.500)	

Statistical analyses

No statistical analyses for this end point

Secondary: Change from baseline in rickets severity assessed by total RSS

End point title	Change from baseline in rickets severity assessed by total RSS

End point description:

End point type	Secondary

End point timeframe:

Change from Baseline to Week 48

End point values	Cohort 1	Cohort 2	Cohort 3	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	2	7	4	
Units: Score on a scale				
arithmetic mean (standard deviation)	-3.50 (± 0.00)	1.86 (± 0.802)	2.13 (± 1.436)	

Statistical analyses

No statistical analyses for this end point

Secondary: Change from baseline in lower extremities skeletal abnormalities as determined by RGI-C long leg score

End point title	Change from baseline in lower extremities skeletal abnormalities as determined by RGI-C long leg score

End point description:

End point type	Secondary

End point timeframe:

Change from Baseline to Week 48

End point values	Cohort 1	Cohort 2	Cohort 3	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	0[2]	4	2	
Units: score on a scale				
arithmetic mean (standard deviation)	()	1.25 (± 0.500)	1.50 (± 0.707)	

Notes:

[2] - 0 subjects were included as data not reported for long leg X-Ray at EoT

Statistical analyses

No statistical analyses for this end point

Secondary: Change from baseline in recumbent length at week 48 in cm

End point title	Change from baseline in recumbent length at week 48 in cm

End point description:

End point type	Secondary

End point timeframe:

Change from baseline to week 48

End point values	Cohort 1	Cohort 2	Cohort 3	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	3	7	4	
Units: centimetre				
arithmetic mean (standard deviation)	13 (± 0.000)	10.43 (± 1.618)	13.50 (± 2.082)	

Statistical analyses

No statistical analyses for this end point

Secondary: Change from baseline at week 48 height-for-age z-score

End point title	Change from baseline at week 48 height-for-age z-score

End point description:

End point type	Secondary

End point timeframe:

Change from baseline to week 48

End point values	Cohort 1	Cohort 2	Cohort 3	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	3	7	4	
Units: score				
arithmetic mean (standard deviation)	-1.09 (± 1.586)	-1.73 (± 0.609)	-1.44 (± 0.860)	

Statistical analyses

No statistical analyses for this end point

Secondary: Change from baseline to week 48 in height-for-age percentiles

End point title	Change from baseline to week 48 in height-for-age percentiles

End point description:

End point type	Secondary

End point timeframe:

Change from baseline to week 48

End point values	Cohort 1	Cohort 2	Cohort 3	
Subject group type	Reporting group	Reporting group	Reporting group	
Number of subjects analysed	3	7	4	
Units: percent				
arithmetic mean (standard deviation)	76.20 (± 151.833)	-129.37 (± 431.598)	4.96 (± 49.597)	

Statistical analyses

No statistical analyses for this end point

Adverse events

Adverse events information	
Timeframe for reporting adverse events:	
From screening to end of study	
Assessment type	Systematic
Dictionary used	
Dictionary name	MedDRA
Dictionary version	26.1
Reporting groups	
Reporting group title	Cohort 1
Reporting group description: -	
Reporting group title	Cohort 2
Reporting group description: -	
Reporting group title	Cohort 3
Reporting group description: -	

Serious adverse events	Cohort 1	Cohort 2	Cohort 3
Total subjects affected by serious adverse events			
subjects affected / exposed	1 / 3 (33.33%)	1 / 9 (11.11%)	0 / 4 (0.00%)
number of deaths (all causes)	0	0	0
number of deaths resulting from adverse events	0	0	0
Injury, poisoning and procedural complications			
Joint dislocation			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences causally related to treatment / all	0 / 1	0 / 0	0 / 0
deaths causally related to treatment / all	0 / 0	0 / 0	0 / 0
Congenital, familial and genetic disorders			
Craniosynostosis			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences causally related to treatment / all	0 / 0	0 / 1	0 / 0
deaths causally related to treatment / all	0 / 0	0 / 0	0 / 0

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

Non-serious adverse events	Cohort 1	Cohort 2	Cohort 3
Total subjects affected by non-serious adverse events			
subjects affected / exposed	3 / 3 (100.00%)	9 / 9 (100.00%)	4 / 4 (100.00%)
General disorders and administration site conditions			
Injection site pain			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	1 / 4 (25.00%)
occurrences (all)	1	0	1
Pyrexia			
subjects affected / exposed	3 / 3 (100.00%)	6 / 9 (66.67%)	3 / 4 (75.00%)
occurrences (all)	21	19	7
Swelling face			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	1	0	0
Vaccination site reaction			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Immune system disorders			
Drug hypersensitivity			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Hypersensitivity			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	1	0	0
Selective IgA immunodeficiency			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	1	0	0
Respiratory, thoracic and mediastinal disorders			
Cough			
subjects affected / exposed	1 / 3 (33.33%)	2 / 9 (22.22%)	1 / 4 (25.00%)
occurrences (all)	1	3	1
Rhinorrhoea			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	1 / 4 (25.00%)
occurrences (all)	0	1	3
Nasal congestion			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	1	0	0

Productive cough			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	1	0	0
Investigations			
Blood parathyroid hormone increased			
subjects affected / exposed	1 / 3 (33.33%)	3 / 9 (33.33%)	0 / 4 (0.00%)
occurrences (all)	2	3	0
Vitamin D decreased			
subjects affected / exposed	0 / 3 (0.00%)	4 / 9 (44.44%)	0 / 4 (0.00%)
occurrences (all)	0	4	0
Glomerular filtration rate decreased			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	1 / 4 (25.00%)
occurrences (all)	0	1	1
Blood alkaline phosphatase increased			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Blood phosphorus decreased			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Blood triglycerides increased			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Creatine urine increased			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Serum ferritin decreased			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Injury, poisoning and procedural complications			
Fall			
subjects affected / exposed	0 / 3 (0.00%)	0 / 9 (0.00%)	2 / 4 (50.00%)
occurrences (all)	0	0	2
Joint dislocation			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	1	0	0
Thermal burn			

subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Congenital, familial and genetic disorders			
Craniosynostosis			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Blood and lymphatic system disorders			
Iron deficiency anaemia			
subjects affected / exposed	0 / 3 (0.00%)	0 / 9 (0.00%)	1 / 4 (25.00%)
occurrences (all)	0	0	1
Ear and labyrinth disorders			
Ear pain			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	1	0	0
Ear swelling			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	1	0	0
Middle ear effusion			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	1	0	0
Eye disorders			
Papilloedema			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Gastrointestinal disorders			
Constipation			
subjects affected / exposed	0 / 3 (0.00%)	3 / 9 (33.33%)	1 / 4 (25.00%)
occurrences (all)	0	4	4
Vomiting			
subjects affected / exposed	2 / 3 (66.67%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	2	3	0
Abdominal pain			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	1 / 4 (25.00%)
occurrences (all)	0	1	1
Diarrhoea			

subjects affected / exposed	0 / 3 (0.00%)	2 / 9 (22.22%)	0 / 4 (0.00%)
occurrences (all)	0	2	0
Teething			
subjects affected / exposed	0 / 3 (0.00%)	2 / 9 (22.22%)	0 / 4 (0.00%)
occurrences (all)	0	2	0
Gingival pain			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Retching			
subjects affected / exposed	0 / 3 (0.00%)	0 / 9 (0.00%)	1 / 4 (25.00%)
occurrences (all)	0	0	1
Toothache			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	3	0
Skin and subcutaneous tissue disorders			
Blister			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Dermatitis acneiform			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Eczema			
subjects affected / exposed	0 / 3 (0.00%)	0 / 9 (0.00%)	1 / 4 (25.00%)
occurrences (all)	0	0	1
Eczema asteatotic			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	1	0	0
Erythema			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	1	0	0
Rash			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	2	0	0
Rash erythematous			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0

Skin lesion			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	1	0	0
Renal and urinary disorders			
Nephrocalcinosis			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	1	0	0
Musculoskeletal and connective tissue disorders			
Pain in extremity			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Infections and infestations			
Nasopharyngitis			
subjects affected / exposed	0 / 3 (0.00%)	4 / 9 (44.44%)	3 / 4 (75.00%)
occurrences (all)	0	6	6
Rhinitis			
subjects affected / exposed	1 / 3 (33.33%)	3 / 9 (33.33%)	3 / 4 (75.00%)
occurrences (all)	2	5	5
Upper respiratory tract infection			
subjects affected / exposed	1 / 3 (33.33%)	5 / 9 (55.56%)	0 / 4 (0.00%)
occurrences (all)	3	5	0
COVID-19			
subjects affected / exposed	0 / 3 (0.00%)	4 / 9 (44.44%)	1 / 4 (25.00%)
occurrences (all)	0	4	1
Bronchiolitis			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	2 / 4 (50.00%)
occurrences (all)	1	0	2
Varicella			
subjects affected / exposed	1 / 3 (33.33%)	2 / 9 (22.22%)	0 / 4 (0.00%)
occurrences (all)	1	2	0
Conjunctivitis			
subjects affected / exposed	0 / 3 (0.00%)	2 / 9 (22.22%)	0 / 4 (0.00%)
occurrences (all)	0	2	0
Ear infection			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	1 / 4 (25.00%)
occurrences (all)	0	1	1

Gastroenteritis			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	1 / 4 (25.00%)
occurrences (all)	0	1	2
Otitis media			
subjects affected / exposed	0 / 3 (0.00%)	2 / 9 (22.22%)	0 / 4 (0.00%)
occurrences (all)	0	2	0
Roseola			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	1 / 4 (25.00%)
occurrences (all)	1	0	1
Erythema infectiosum			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Hand-foot-and-mouth disease			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Molluscum contagiosum			
subjects affected / exposed	1 / 3 (33.33%)	0 / 9 (0.00%)	0 / 4 (0.00%)
occurrences (all)	1	0	0
Metabolism and nutrition disorders			
Acidosis			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0
Hypocalcaemia			
subjects affected / exposed	0 / 3 (0.00%)	1 / 9 (11.11%)	0 / 4 (0.00%)
occurrences (all)	0	1	0

More information

Substantial protocol amendments (globally)

Were there any global substantial amendments to the protocol? Yes

Date	Amendment
02 April 2020	• The requirement that targeted radiographic assessments to diagnose and monitor skeletal abnormalities identified during routine standard of care assessments be reported as an unscheduled visit in the eCRF and evaluated centrally was removed as there was no requirement to collect these data as part of the study. Any skeletal abnormalities identified during the study were reported as AEs or SAEs, as appropriate. • A new Clinical Trial Manager was appointed.
26 June 2020	• Serum creatinine and serum calcium were collected at the same timepoints as for spot urine in order to be able to calculate the TmP/GFR and the creatinine/calcium ratio. No additional blood sampling was required. • Following recommendation by the DSMB and because formula milk contained higher levels of phosphate, the nutritional status (i.e., breast fed, bottle fed with formula milk, weaned, dietary changes, etc) of the subject was recorded at intervals throughout the study. • The procedure for increasing a patient's dose was clarified. • The Baseline renal ultrasound was moved to Screening as it formed part of the inclusion criteria. • In order to allow pharmacies sufficient time to prepare the first dose an additional weight measurement was taken at Screening. In addition, the study schedule of events table was corrected to include weight measurements on Day 14 and Week 6. • In cases where the genetic testing for PHEX mutation was required, the testing was performed during Screening or within the first 20 weeks on the study, rather than within the first 24 weeks on the study. • The serum phosphate analysis used to determine the patient's hypophosphatemia status for the inclusion criteria was conducted by a local laboratory. • The requirement to enter AE information in the eCRF within 24 hours was removed. • It was clarified that a Laboratory Manual detailing blood sample collection, preparation, labeling, and storage was only provided for the Central Laboratory. • All subjects were assessed for the occurrence of AEs from the time following the first dose of investigational product until 56 days after the last dose or until Week 76 (whichever was longer). • Details on the reporting of any COVID-19 infections were included.

27 January 2021	• The planned treatment duration was updated from at least 64 weeks to up to 48 weeks since the safety and efficacy of burosumab had previously been demonstrated in other clinical trials included in the marketing authorization. A 48 week study did not limit access of the patient to treatment as the product was indicated for patients from 12 months of age, and given that the study provided for a 30-day Screening period followed by 48 weeks of treatment, this ensured that any patient completing the study were more than 12 months old at study completion. Consequently, the frequency and timing of certain assessments were amended. • The study design had been revised to remove Cohort 4 and the Expansion Part (Part 2). There was more flexibility for dosing of subjects <6 months of age in Cohort 3, allowing the starting dose to be increased to 0.8 mg/kg if deemed safe and appropriate. • The requirement to offer subjects participation in a 96-week follow-up extension study was removed, as data on effects of long-term treatment were available from 3 studies in pediatric XLH subjects aged 1 to 12 years (UX023 CL201, UX023 CL205, and UX023 CL301); therefore, there was no need for a further extension study after completion of BUR CL207. Subjects were offered long term follow-up in the Kyowa Kirin Registry upon consent by their legally authorized representative in territories where this was available at the time the subject completed 48 weeks of treatment. • The exploratory endpoint to measure time to appearance of radiological abnormalities due to XLH was removed as it could not be evaluated with only 2 X rays. • Day 3 and Day 11 visits were removed to reduce the burden of visits for families and the site during the initial 2 weeks and PK timepoints had been updated to match PD timepoints. • The Burosumab Dosing Recommendations tables were removed for simplification.
13 October 2022	• The minimum number of evaluable subjects to be enrolled into the study was updated to at least 14 in line with the PIP commitment. • Exclusion criterion 3 was updated to remove the wording "and estimated GFR (eGFR, calculated using the Bedside Schwartz equation) below the age-adjusted normal range", since this equation was not developed and validated in infants below 12 months of age and is thus not applicable to the patient population to be enrolled in this study. • A timepoint was added at Week 26 for 1,25(OH)2D as it had previously not been included in error. • Subgroup analysis performed for age group was removed as analyses would only be performed by cohort. • Wording was updated regarding the marketing authorization and clinical studies completion statuses. • Wording was added to the Study Schedule of Events to clarify that if spot urine could not be collected this would not be a protocol deviation. • The requirement for the calculation of percentiles for age-adjusted normal ranges to be provided for each Investigational Site before enrolling the first subject was deleted. • The Sponsor Medical Monitor contact details were updated.

Notes:

Interruptions (globally)

Were there any global interruptions to the trial? No

Limitations and caveats

None reported