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REIVINDICACIONES

1. Una composición farmacéutica que comprende un anticuerpo anti-FGF23, en donde el anticuerpo anti-FGF23 comprende las secuencias CDR de SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, y SEQ ID NO: 6, y en donde dicha composición farmacéutica comprende el anticuerpo anti-FGF23 en una concentración de 0,8 mg/kg a 2 mg/kg de peso corporal del paciente.
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2. La composición farmacéutica de acuerdo con la reivindicación 1, en donde la cadena pesada del anticuerpo anti-FGF23 comprende una secuencia de SEQ ID NO: 7.
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3. La composición farmacéutica de acuerdo con la reivindicación 1, en donde la cadena liviana del anticuerpo anti-FGF23 comprende una secuencia de SEQ ID NO: 8.
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4. La composición farmacéutica de acuerdo con la reivindicación 1, en donde la cadena pesada del anticuerpo anti-FGF23 comprende una secuencia de SEQ ID NO: 7 y la cadena liviana del anticuerpo anti-FGF23 comprende una secuencia de SEQ ID NO: 8.
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5. La composición farmacéutica de acuerdo con la reivindicación 1, en donde dicha composición farmacéutica está envasada en un vial de uso único.
- 30 6. La composición farmacéutica de acuerdo con la reivindicación 5, en donde dicho vial de uso único es un vial de 5 mL.
7. La composición farmacéutica de acuerdo con la reivindicación 6, en donde dicho vial de uso único comprende 1 mL de dicho anticuerpo anti-FGF23 en una concentración de 10 mg/mL.
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8. La composición farmacéutica de acuerdo con la reivindicación 6, en donde dicho vial de uso único comprende 1 mL de dicho anticuerpo anti-FGF23 en una concentración de 30 mg/mL.

P-12588

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIRECCIÓN DE NUEVAS CREACIONES

E. S. D.

Re: Expediente No. **NC2016/0005086**

Solicitud de patente a nombre de **ULTRAGENYX PHARMACEUTICAL INC., KYOWA HAKKO KIRIN CO. LTD.**

Yo, CAROLINA DAZA MONTALVO identificada como aparece al pie de mi firma, domiciliada en la Carrera 11 No. 86-53, piso 3, obrando como apoderada de las sociedades ULTRAGENYX PHARMACEUTICAL INC. y KYOWA HAKKO KIRIN CO. LTD., domiciliadas en California – Estados Unidos de América y Tokio – Japón, respectivamente, Solicitantes de la patente de la referencia, en respuesta al oficio No. **4827** notificado electrónicamente el 25 de abril de 2018, relacionado con concepto técnico de fondo, y teniendo en cuenta la solicitud de prórroga por treinta (30) días presentada el 21 de junio de 2018, atentamente me permito informar que, con fundamento en la facultad que confiere el artículo 34 de la Decisión 486 al solicitante para modificar la solicitud de patente en cualquier momento del trámite, se realizan las siguientes modificaciones:

1. Modificaciones Presentadas

El Examinador ha indicado en el oficio que se contesta que “[l]as modificaciones del capítulo reivindicatorio presentadas mediante el Radicado N°. NC2016/0005086 del 21 de abril de 2017, no son aceptadas porque constituyen una ampliación a la materia contenida en la solicitud original. La descripción de la presente solicitud carece de soporte que sustente la modificación del objeto del capítulo reivindicatorio a una composición farmacéutica como ahora es la pretensión de la solicitante mediante el nuevo pliego reivindicatorio. Si bien la descripción hace referencia a una posible composición para tratar a un paciente y divulga de manera general una ilimitada variedad de posibles componentes y formas farmacéuticas, la misma carece de ejemplos de formulación específicos que describan las formulaciones verdaderamente desarrolladas, tampoco se define el método de elaboración de las mismas y no existen ejemplos de ensayos relacionados con el uso de una formulación específica que dé solución a un problema técnico determinado” (énfasis añadido).

En respuesta a ello, respetuosamente nos permitimos manifestar que, de acuerdo con lo establecido en la Guía Para Examen de Solicitudes de Patente de Invención y Modelo de Utilidad,

*“Cuando la descripción menciona además de los métodos de tratamiento, los elementos generales que conforman las composiciones tales como los excipientes y principios activos, aunque no describa una composición específica, entonces **el examinador aceptará la modificación del capítulo reivindicatorio de método de tratamiento a composición.***

Por ejemplo:

La descripción menciona: compuestos de benzo-1-triazol sustituidos de fórmula I, composiciones farmacéuticas, procesos para su preparación.

La reivindicación 1 se refiere a: “Un método de tratamiento de un estado de enfermedad mediado por quimiocinas, que comprende administrar a dicho mamífero una cantidad eficaz de un compuesto de fórmula I”.

Reivindicación modificada:

“Composiciones farmacéuticas que contienen un compuesto de fórmula I y excipientes farmacéuticamente aceptables”.

En este caso, el examinador aceptará la reivindicación modificada puesto que la descripción mencionaba las composiciones farmacéuticas que contienen el compuesto de fórmula I” (énfasis añadido) (ítem 2.2. Páginas 56 y 57).

Ahora bien, en el caso puntual de la presente solicitud, la descripción inicialmente presentada claramente menciona las composiciones farmacéuticas que comprenden el anticuerpo anti-FGF 23. Es así como los Párrafos [00128], [00129], [00133] – [00136], [00131] – [00141], entre otros, soportan la materia reclamada en el capítulo reivindicatorio presentado mediante el Radicado N°. NC2016/0005086 del 21 de abril de 2017.

Adicionalmente, se llama la atención del Examinador sobre los lineamientos incluidos en el artículo 30 de la Decisión 486/00, que establece que “*las reivindicaciones definirán la materia que se desea proteger mediante la patente. Deben ser claras y concisas y estar enteramente sustentadas por la descripción*” De esta forma, la invención debe ser clara y estar soportada por la información incluida en la descripción de la solicitud, lo cual ocurre en la presente solicitud. Sin embargo, Sin embargo, la ley de patentes colombiana no menciona que los ejemplos ilustrativos, que son opcionales para facilitar la comprensión de la invención y respaldar las ventajas descritas, son una limitación de la invención. Por lo tanto, solicitar una

limitación de la invención al tema divulgado en los ejemplos es una interpretación indebida de la ley de patentes colombiana.

De este modo, teniendo en cuenta lo establecido por la oficina de Patentes de nuestro país y considerando que la descripción presentada junto con la presente solicitud claramente soporta la materia reclamada en el capítulo reivindicatorio presentado el 21 de abril de 2017, la cual corresponde a materia patentable de acuerdo con nuestra legislación y está dirigida a una composición farmacéutica que comprende un anticuerpo anti-FGF23, solicitamos respetuosamente que el Examinador acepte la modificación del capítulo reivindicatorio de método de tratamiento a composición.

2. Reivindicaciones

Adicionalmente, se informa que se presenta junto con este memorial un nuevo capítulo reivindicatorio, el cual consta de ocho (8) reivindicaciones, y que reemplaza completamente el presentado anteriormente. Específicamente, se realizaron las siguientes modificaciones:

- 2.1 No se incluyen las anteriores reivindicaciones 5 y 6.
- 2.2 Se modificó la anterior reivindicación 1.

En cuanto a estas modificaciones, me permito decir que las mismas no amplían de ninguna manera la materia objeto de la presente solicitud y se realizaron con el ánimo de dar mayor claridad a la materia reclamada.

3. Pago de tasas

Considerando que el presente memorial se presenta junto con modificaciones a las reivindicaciones, se adjunta recibo por concepto de examen de patentabilidad, según lo establecido en la Resolución 3719 de 2016.

En relación con el número de reivindicaciones, atentamente nos permitimos decir que no se adjunta tasa por concepto de reivindicaciones adicionales, toda vez que el nuevo capítulo reivindicatorio tiene menor número de cláusulas que el anteriormente presentado y en esencia es el mismo objeto, pero definido con mayor claridad.

4. Claridad de la solicitud

Los Solicitantes manifiestan que las nuevas reivindicaciones proporcionan claridad y concisión a la invención descrita.

4.1 Como primera medida, se informa que no se incluyen las anteriores reivindicaciones 5 y 6.

4.2 Se informa que se modificó la reivindicación 1 con el propósito de recitar:

“Una composición farmacéutica que comprende un anticuerpo anti-FGF23, en donde el anticuerpo anti-FGF23 comprende las secuencias CDR de SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, y SEQ ID NO: 6, y en donde dicha composición farmacéutica comprende el anticuerpo anti-FGF23 en una concentración de 0,8 mg/kg a 2 mg/kg de peso corporal del paciente”.

Adjunto al presente memorial se presenta copia de la etiqueta del producto CRYSVITA, el cual es un anticuerpo bloqueante de crecimiento de fibroblastos factor 23 (FGF23) indicado para el tratamiento de hipofosfatemia ligada al cromosoma X (XLH) en pacientes adultos y pediátricos de 1 año de edad en adelante. Tal como se indica en la primera página de la etiqueta del producto, la dosis inicial en pacientes pediátricos es de 0,8 mg/kg de peso corporal redondeado a la dosis de 10 mg más cercana, administrada cada dos semanas. La dosis inicial mínima es de 10 mg hasta una dosis máxima de 90 mg (2 mg/kg).

El producto se proporciona en viales de dosis única que contienen tres concentraciones de dosificación:

- 10 mg/ml
- 20 mg/ml
- 30 mg/ml

Es así como el soporte en la solicitud para la cantidad de dosificación de 0,8 mg/kg a 2 mg/kg de peso corporal divulgada en la nueva reivindicación 1 se encuentra en el Párrafo [00146] de la solicitud PCT de la siguiente manera: *“En algunas realizaciones adicionales distintas, el régimen de dosificación incluye una cantidad predeterminada o fija por dosis en combinación con una frecuencia de dicha dosis (...) En algunas realizaciones, la cantidad fija de anticuerpo anti-FGF23 por dosis incluyen, sin ninguna limitación (...) aproximadamente 0,8 mg/kg de peso corporal, (...) aproximadamente 2 mg/kg de peso corporal (...)”.*

Además, es de mencionar que el soporte para los viales de dosificación de 10 mg/ml y 30 mg/ml (materia reclamada en las nuevas reivindicaciones 7 y 8) se proporciona en el Párrafo [00314] de la solicitud PCT de la siguiente manera: *“Producto de investigación, Dosis y modo de administración: El KRN23 es una solución estéril, transparente, incolora y libre de conservantes en viales de 5 mL de uso único que contienen 1 mL de KRN23 a una concentración de 10 mg/mL o 30 mg/mL (...)”.*

En consecuencia, nos permitimos indicar que el presente capítulo reivindicatorio, que incluye ocho (8) reivindicaciones, se ajusta a las disposiciones del artículo 30 de la Decisión 486/00.

5. Novedad y Nivel Inventivo

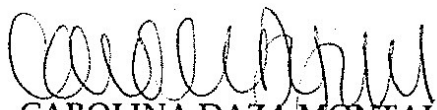
Dado los argumentos anteriormente expuestos, los cuales demuestran que la materia actualmente reclamada corresponde a materia patentable, la cual se encuentra debidamente soportada por la descripción inicialmente presentada y, teniendo en cuenta que junto con el presente memorial se presenta el comprobante de pago para nuevo examen de patentabilidad, respetuosamente solicitamos sea llevado a cabo el examen de fondo respectivo a fin de que nuestros mandantes tengan la posibilidad de defender su invención.

En este sentido, considerando la opinión del Examinador indicando que “*Carpenter et al., divulga un método de tratamiento para pacientes con hiperfosfatemia que comprende la administración de KRN23 que es un ligando anti-FGF23, o placebo a pacientes, donde el régimen de dosificación es determinado con base en uno o más parámetros PD del ligando anti-FGF23*”, los Solicitantes respetuosamente manifiestan que Carpenter *et al.* sólo enseña la dosificación en **adultos**, que se administra cada 4 semanas (es decir, Q4W). Además, Carpenter *et al.* enseña las siguientes concentraciones para administración subcutánea: 0,1 mg/kg, 0,3 mg/kg, 0,6 mg/kg y 1 mg/kg (ver Tabla 5 de Carpenter *et al.*). Una concentración más alta que 1 mg/kg **no es** enseñada. Por lo tanto, una composición farmacéutica que comprende un anticuerpo anti-FGF23 a una concentración de 0,8 mg/kg a 2 mg/kg de peso corporal del paciente, con uso pediátrico cada 2 semanas (es decir, Q2W), no es divulgada, sugerida o enseñada por Carpenter *et al.*

Habiendo atendido cabalmente las objeciones presentadas por ese despacho, atentamente solicitamos se conceda el privilegio de patente de invención a la solicitud en estudio o si el señor Examinador considera que subsisten razones para objetar la presente invención, rogamos expedir otro examen de fondo con los debidos motivos y razones que sustenten su objeción con el fin de que nuestro mandante tenga la posibilidad de exponer sus argumentos con base en la interpretación de los artículos 45 de la Decisión 486 -el cual otorga la facultad al Examinador para emitir los exámenes de fondo- y 42 del Código de Procedimiento Administrativo y de lo Contencioso Administrativo que señala que: “*habiéndose dado oportunidad a los interesados para expresar sus opiniones, y con base en las pruebas e informes disponibles, se tomará la decisión, que será motivada. La decisión resolverá todas las peticiones que hayan sido oportunamente planteadas dentro de la actuación por el peticionario y por los terceros reconocidos*”, (el subrayado es nuestro).

En consecuencia, solicitamos a ese despacho pronunciarse en relación con todos los argumentos presentados en este memorial dando estricta aplicación al principio del debido proceso consagrado en el artículo 29 de la Constitución Nacional

Señor Director,



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ANEXOS

- Nuevo capítulo reivindicatorio conformado por ocho (8) reivindicaciones.
- Comprobante de pago de tasa de nuevo examen de patentabilidad.
- Copia de la etiqueta del producto CRYSVITA.

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REIVINDICACIONES

1. Una composición farmacéutica que comprende un anticuerpo anti-FGF23, en donde el anticuerpo anti-FGF23 comprende las secuencias CDR de SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, y SEQ ID NO: 6, y en donde dicha composición farmacéutica comprende el anticuerpo anti-FGF23 en una concentración de 0,8 mg/kg a 2 mg/kg de peso corporal del paciente.
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2. La composición farmacéutica de acuerdo con la reivindicación 1, en donde la cadena pesada del anticuerpo anti-FGF23 comprende una secuencia de SEQ ID NO: 7.
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3. La composición farmacéutica de acuerdo con la reivindicación 1, en donde la cadena liviana del anticuerpo anti-FGF23 comprende una secuencia de SEQ ID NO: 8.
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4. La composición farmacéutica de acuerdo con la reivindicación 1, en donde la cadena pesada del anticuerpo anti-FGF23 comprende una secuencia de SEQ ID NO: 7 y la cadena liviana del anticuerpo anti-FGF23 comprende una secuencia de SEQ ID NO: 8.
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5. La composición farmacéutica de acuerdo con la reivindicación 1, en donde dicha composición farmacéutica está envasada en un vial de uso único.
- 30 6. La composición farmacéutica de acuerdo con la reivindicación 5, en donde dicho vial de uso único es un vial de 5 mL.
7. La composición farmacéutica de acuerdo con la reivindicación 6, en donde dicho vial de uso único comprende 1 mL de dicho anticuerpo anti-FGF23 en una concentración de 10 mg/mL.
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8. La composición farmacéutica de acuerdo con la reivindicación 6, en donde dicho vial de uso único comprende 1 mL de dicho anticuerpo anti-FGF23 en una concentración de 30 mg/mL.

HIGHLIGHTS OF PRESCRIBING INFORMATION

These highlights do not include all the information needed to use CRYSVITA safely and effectively. See full prescribing information for CRYSVITA.

CRYSVITA® (burosumab-twza) injection, for subcutaneous use
Initial U.S. Approval: 2018

INDICATIONS AND USAGE

CRYSVITA is a fibroblast growth factor 23 (FGF23) blocking antibody indicated for the treatment of X-linked hypophosphatemia (XLH) in adult and pediatric patients 1 year of age and older. (1)

DOSAGE AND ADMINISTRATION

For subcutaneous use only (2)

- Pediatric XLH:** Starting dose regimen is 0.8 mg/kg of body weight rounded to the nearest 10 mg, administered every two weeks. The minimum starting dose is 10 mg up to a maximum dose of 90 mg. (2.1)
Dose may be increased up to approximately 2 mg/kg (maximum 90 mg), administered every two weeks to achieve normal serum phosphorus. (2.1)
- Adult XLH:** Dose regimen is 1 mg/kg body weight rounded to the nearest 10 mg up to a maximum dose of 90 mg administered every four weeks. (2.2)

DOSAGE FORMS AND STRENGTHS

Injection: 10 mg/mL, 20 mg/mL, or 30 mg/mL in a single-dose vial (3)

CONTRAINDICATIONS

- Do not use CRYSVITA with oral phosphate and active vitamin D analogs. (4)
- Do not initiate CRYSVITA if serum phosphorus is within or above the normal range for age. (4)
- CRYSVITA is contraindicated in patients with severe renal impairment or end stage renal disease. (4)

WARNINGS AND PRECAUTIONS

- Hypersensitivity:** Discontinue CRYSVITA if serious hypersensitivity reactions occur and initiate appropriate medical treatment. (5.1)
- Hyperphosphatemia and Risk of Nephrocalcinosis:** For patients already taking CRYSVITA, dose interruption and/or dose reduction may be required based on a patient's serum phosphorus levels. (5.2)
- Injection Site Reactions:** Administration of CRYSVITA may result in local injection site reactions. Discontinue CRYSVITA if severe injection site reactions occur and administer appropriate medical treatment. (5.3, 6.1)

ADVERSE REACTIONS

Most common adverse reactions (≥25%) in pediatric XLH patients are: headache, injection site reaction, vomiting, pyrexia, pain in extremity, vitamin D decreased. (6.1)

Most common adverse reactions (≥5% and in at least 2 patients more than placebo) in adult XLH patients are: back pain, headache, tooth infection, restless leg syndrome, vitamin D decreased, dizziness, constipation, blood phosphorus increased. (6.1)

To report SUSPECTED ADVERSE REACTIONS, contact **Ultragenyx** at 1-888-756-8657 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

See 17 for PATIENT COUNSELING INFORMATION

Revised: 04/2018

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FULL PRESCRIBING INFORMATION

1 INDICATIONS AND USAGE

CRYSVITA is indicated for the treatment of X-linked hypophosphatemia (XLH) in adult and pediatric patients 1 year of age and older.

2 DOSAGE AND ADMINISTRATION

CRYSVITA is administered by subcutaneous injection and should be administered by a healthcare provider.

Discontinue oral phosphate and active vitamin D analogs 1 week prior to initiation of treatment. Fasting serum phosphorus concentration should be below the reference range for age prior to initiation of treatment.

2.1 Pediatric Patients with X-linked Hypophosphatemia (1 to less than 18 years of age)

The recommended starting dose regimen is 0.8 mg/kg of body weight, rounded to the nearest 10 mg, administered every two weeks. The minimum starting dose is 10 mg up to a maximum dose of 90 mg.

After initiation of treatment with CRYSVITA, measure fasting serum phosphorus every 4 weeks for the first 3 months of treatment, and thereafter as appropriate. If serum phosphorus is above the lower limit of the reference range for age and below 5 mg/dL, continue treatment with the same dose. Follow dose adjustment schedule below to maintain serum phosphorus within the reference range for age.

Dose Adjustment

Reassess fasting serum phosphorus level 4 weeks after dose adjustment.

Do not adjust CRYSVITA more frequently than every 4 weeks.

Dose Increase: If serum phosphorus is below the reference range for age, the dose may be increased stepwise up to approximately 2 mg/kg, administered every two weeks (maximum dose of 90 mg) according to the dosing schedule shown in [Table 1](#).

Table 1: Pediatric Dose Schedule for Stepwise Dose Increase

Body Weight (kg)	Starting Dose (mg)	First Dose Increase to (mg)	Second Dose Increase to (mg)
10 - 14	10	15	20
15 - 18	10	20	30
19 - 31	20	30	40
32 - 43	30	40	60
44 - 56	40	60	80
57 - 68	50	70	90
69 - 80	60	90	90
81 - 93	70	90	90
94 - 105	80	90	90
106 and greater	90	90	90

Dose Decrease: If serum phosphorus is above 5 mg/dL, withhold the next dose and reassess the serum phosphorus level in 4 weeks. The patient must have serum phosphorus below the reference range for age to reinitiate CRYSVITA. Once serum phosphorus is below the reference range for age, treatment may be restarted according to the dose schedule shown in [Table 2](#). Reassess serum phosphorus level 4 weeks after dose adjustment. If the level remains below the reference range for age after the re-initiation dose, the dose can be adjusted according to [Table 1](#).

Table 2: Pediatric Dose Schedule for Re-Initiation of Therapy

Previous Dose (mg)	Re-Initiation Dose (mg)
10	5
15	10
20	10
30	10
40	20
50	20
60	30
70	30
80	40
90	40

2.2 Adult Patients with X-linked Hypophosphatemia (18 years of age and older)

The recommended dose regimen in adults is 1 mg/kg body weight, rounded to the nearest 10 mg up to a maximum dose of 90 mg, administered every four weeks.

After initiation of treatment with CRYSVITA, assess fasting serum phosphorus on a monthly basis, measured 2 weeks post-dose, for the first 3 months of treatment, and thereafter as appropriate. If serum phosphorus is within the normal range, continue with the same dose.

Dose Decrease

Reassess fasting serum phosphorus level 2 weeks after dose adjustment.

Do not adjust CRYSVITA more frequently than every 4 weeks.

If serum phosphorus is above the normal range, withhold the next dose and reassess the serum phosphorus level after 4 weeks. The patient must have serum phosphorus below the normal range to be able to reinitiate CRYSVITA. Once serum phosphorus is below the normal range, treatment may be restarted at approximately half the initial starting dose up to a maximum dose of 40 mg every 4 weeks according to the dose schedule shown in [Table 3](#). Reassess serum phosphorus 2 weeks after any change in dose.

Table 3: Adult Dose Schedule for Re-Initiation of Therapy

Previous Dose (mg)	Re-Initiation Dose (mg)
40	20
50	20
60	30
70	30
80 and greater	40

2.3 Missed Dose

If a patient misses a dose, resume CRYSVITA as soon as possible at the prescribed dose.

2.4 General Considerations for Subcutaneous Administration

Injection sites should be rotated with each injection administered at a different anatomic location (upper arms, upper thighs, buttocks, or any quadrant of abdomen) than the previous injection. Do not inject into moles, scars, or areas where the skin is tender, bruised, red, hard, or not intact.

The maximum volume of CRYSVITA per injection site is 1.5 mL. If more than 1.5 mL is required on a given dosing day, the total volume of CRYSVITA should be split and administered at two different injection sites. Monitor for signs of reactions.

Visually inspect CRYSVITA for particulate matter and discoloration prior to administration. CRYSVITA is a sterile, preservative-free, clear to slightly opalescent and colorless to pale brown-yellow solution for subcutaneous injection. Do not use if the solution is discolored or cloudy or if the solution contains any particles or foreign particulate matter.

3 DOSAGE FORMS AND STRENGTHS

Injection: 10 mg/mL, 20 mg/mL, or 30 mg/mL clear to slightly opalescent and colorless to pale brown-yellow solution in a single-dose vial.

4 CONTRAINDICATIONS

Do not use CRYSVITA with oral phosphate and active vitamin D analogs.

Do not initiate CRYSVITA treatment if serum phosphorus is within or above the normal range for age.

CRYSVITA is contraindicated in patients with severe renal impairment or end stage renal disease because these conditions are associated with abnormal mineral metabolism.

5 WARNINGS AND PRECAUTIONS

5.1 Hypersensitivity

Hypersensitivity reactions (e.g. rash, urticaria) have been reported in patients with CRYSVITA. Discontinue CRYSVITA if serious hypersensitivity reactions occur and initiate appropriate medical treatment [see *Adverse Reactions* (6.1)].

5.2 Hyperphosphatemia and Risk of Nephrocalcinosis

Increases in serum phosphorus to above the upper limit of normal may be associated with an increased risk of nephrocalcinosis. For patients already taking CRYSVITA, dose interruption and/or dose reduction may be required based on a patient's serum phosphorus levels [see *Dosage and Administration* (2)].

5.3 Injection Site Reactions

Administration of CRYSVITA may result in local injection site reactions. Discontinue CRYSVITA if severe injection site reactions occur and administer appropriate medical treatment [see *Adverse Reactions* (6.1)].

6 ADVERSE REACTIONS

The following adverse reactions are described below and elsewhere in the labeling:

- Hypersensitivity [see *Warnings and Precautions* (5.1)]
- Hyperphosphatemia and Risk of Nephrocalcinosis [see *Warnings and Precautions* (5.2)]
- Injection Site Reactions [see *Warnings and Precautions* (5.3)]

6.1 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.

Adverse Reactions in Pediatric Patients with XLH

The safety data described below reflect exposure to CRYSVITA in 65 pediatric XLH patients that included 52 exposed for at least 64 weeks (Study 1) and 13 exposed for at least 40 weeks (Study 2). Overall, pediatric XLH patients have been exposed to CRYSVITA for a mean duration of 108 weeks (min 40.9, max 150.0). CRYSVITA was studied in two pediatric open-label phase 2 studies (Study 1, ages 5 to 12 years, n = 52; Study 2, ages ≥ 1 to < 5 years, n = 13). Overall, the patient population was 1-12 years (mean age 7.4 years), 51% male, and 89% white/Caucasian and diagnosed with XLH. In Study 1, 26 of the patients received CRYSVITA at a mean dose of 1.05 mg/kg (range 0.4 – 2.0 mg/kg) every 2 weeks at Week 64; the other 26 patients received CRYSVITA every 4 weeks. In Study 2, patients received CRYSVITA at a mean dose of 0.89 mg/kg (range 0.8 – 1.2 mg/kg) every 2 weeks at Week 40. Adverse reactions reported in more than 10% of CRYSVITA-treated patients from Studies 1 and 2 are shown in [Table 4](#).

Table 4: Adverse Reactions Reported in More Than 10% of Pediatric Patients Receiving CRYSVITA in Studies 1 and 2

Adverse Reaction	Study 1 (N=52) n (%)	Study 2 (N=13) n (%)	Overall (N=65) n (%)
Headache	38 (73)	1 (8)	39 (60)
Injection site reaction ¹	35 (67)	3 (23)	38 (59)
Vomiting	25 (48)	6 (46)	31 (48)
Pyrexia	23 (44)	8 (62)	31 (48)
Pain in extremity	24 (46)	3 (23)	27 (42)
Vitamin D decreased ²	19 (37)	2 (15)	21 (32)
Rash ³	14 (27)	1 (8)	15 (23)
Toothache	12 (23)	2 (15)	14 (22)
Myalgia	9 (17)	1 (8)	10 (15)
Tooth abscess	8 (15)	3 (23)	11 (17)
Dizziness ⁴	8 (15)	0 (0)	8 (12)

n = number of patients with an event; N = total number of patients who received at least one dose of CRYSVITA

¹ Injection site reaction includes: injection site reaction, injection site erythema, injection site pruritus, injection site swelling, injection site pain, injection site rash, injection site bruising, injection site discoloration, injection site discomfort, injection site hematoma, injection site hemorrhage, injection site induration, injection site macule, and injection site urticaria

² Vitamin D decreased includes: vitamin D deficiency, blood 25-hydroxycholecalciferol decreased, and vitamin D decreased

³ Rash includes: rash, rash pruritic, rash maculopapular, and rash pustular

⁴ Dizziness includes: dizziness, and dizziness exertional

Hypersensitivity Reactions

In pediatric patients, the most frequent potential hypersensitivity events were rash (22%), injection site rash (6%), and urticaria (5%).

Hyperphosphatemia

In pediatric studies, there were no events of hyperphosphatemia reported.

Injection Site Reactions (ISR)

In pediatric studies, approximately 58% of the patients had a local reaction (e.g. injection site urticaria, erythema, rash, swelling, bruising, pain, pruritus, and hematoma) at the site of CRYSVITA injection. Injection site reactions were generally mild in severity, occurred within 1 day of injection, lasted approximately 1 to 3 days, required no treatment, and resolved in almost all instances.

Adverse Reactions in Adult Patients with XLH

The safety data described below reflect exposure to CRYSVITA in 68 adult XLH patients, age 20-63 years (mean age 41 years), of whom most were white/Caucasian (81%) and female (65%). These patients were enrolled in a randomized, double-blind, placebo-controlled Phase 3 study in adults with XLH (Study 3: CRYSVITA = 68, Placebo = 66), in which patients received CRYSVITA at a mean dose of 0.95 mg/kg (range 0.3 – 1.2 mg/kg) subcutaneously every 4 weeks at Week 24. Adverse reactions reported in more than 5% of CRYSVITA-treated patients and 2 patients or more than with placebo from the 24-week placebo-controlled portion of Study 3 are shown in [Table 5](#).

Table 5: Adverse Reactions Occurring in More Than 5% of CRYSVITA-Treated Adult Patients and in at Least 2 Patients More Than with Placebo in Study 3

Adverse Reaction	CRYSVITA (N=68) n (%)	Placebo (N=66) n (%)
Back pain	10 (15)	6 (9)
Headache ¹	9 (13)	6 (9)
Tooth infection ²	9 (13)	6 (9)
Restless legs syndrome	8 (12)	5 (8)
Vitamin D decreased ³	8 (12)	3 (5)
Dizziness	7 (10)	4 (6)
Constipation	6 (9)	0 (0)
Blood phosphorus increased ⁴	4 (6)	0 (0)

n = number of patients with an event; N = total number of patients who received at least one dose of CRYSVITA or placebo

¹ Headache includes: headache, and head discomfort

² Tooth infection includes: tooth abscess, and tooth infection

³ Vitamin D decreased includes: vitamin D deficiency, blood 25-hydroxycholecalciferol decreased, and vitamin D decreased

⁴ Blood phosphorus increased includes: blood phosphorus increased, and hyperphosphatemia

Hypersensitivity Reactions

In the double-blind period of Study 3, approximately 6% of patients in both the CRYSVITA and placebo treatment groups experienced a hypersensitivity event. The events were mild or moderate and did not require discontinuation.

Hyperphosphatemia

In the double-blind period of Study 3, 7% of patients in the CRYSVITA treatment group experienced hyperphosphatemia meeting the protocol-specified criteria for dose reduction (either a single serum phosphorus greater than 5.0 mg/dL or serum phosphorus greater than 4.5 mg/dL [the upper limit of normal] on two occasions). The hyperphosphatemia was managed with dose reduction. The dose for all patients meeting the protocol-specified criteria was reduced 50 percent. A single patient required a second dose reduction for continued hyperphosphatemia.

Injection Site Reactions (ISR)

In the double-blind period of Study 3, approximately 12% of patients in both the CRYSVITA and placebo treatment groups had a local reaction (e.g. injection site reaction, erythema, rash, bruising, pain, pruritus, and hematoma) at the site of the injection. Injection site reactions were generally mild in severity, occurred within 1 day of injection, lasted approximately 1 to 3 days, required no treatment, and resolved in almost all instances.

Restless Leg Syndrome (RLS)

In the double-blind period of Study 3, approximately 12% of the CRYSVITA treatment group had worsening of baseline restless leg syndrome (RLS) or new onset RLS of mild to moderate severity; these events did not lead to dose discontinuation. Nonserious RLS has also been reported in other repeat dose adult XLH studies; in one case, worsening baseline RLS led to drug discontinuation and subsequent resolution of the event.

Spinal Stenosis

Spinal stenosis is prevalent in adults with XLH and spinal cord compression has been reported. In the CRYSVITA phase 2 and phase 3 studies of adults with XLH (total N=176), a total of 6 patients underwent spinal surgery. Most of these cases appeared to involve progression of a pre-existing spinal stenosis. It is unknown if CRYSVITA therapy exacerbates spinal stenosis or spinal cord compression.

6.2 Immunogenicity

As with all therapeutic proteins, there is potential for immunogenicity. The detection of antibody formation is highly dependent on the sensitivity and specificity of the assay. Additionally, the observed incidence of antibody (including neutralizing antibody) positivity in an assay may be influenced by several factors including assay methodology, sample handling, timing of sample collection, concomitant medications, and underlying disease. For these reasons, comparison of the incidence of antibodies to burosumab-twza in the studies described below with the incidence of antibodies in other studies or to other products may be misleading.

Pre-existing anti-drug antibodies (ADA) have been detected in up to 10% of patients in clinical studies. ADA was not detected in patients who were antibody negative at the start of treatment. However, the assay used to measure ADA is subject to interference by serum burosumab-twza, possibly resulting in an underestimation of the incidence of antibody formation. Due to the limitation of the assay conditions, the potential clinical impact of antibodies to burosumab-twza is not known.

8 USE IN SPECIFIC POPULATIONS

8.1 Pregnancy

Risk Summary

There are no available data on CRYSVITA use in pregnant women to inform a drug-associated risk of adverse developmental outcomes. In utero, burosumab-twza exposure in cynomolgus monkeys did not result in teratogenic effects. Adverse effects such as late fetal loss and preterm birth were observed in pregnant cynomolgus monkeys, however, these effects are unlikely to indicate clinical risk because they occurred at a drug exposure that was 64-fold higher, by AUC, than the human exposure at 1 mg/kg every 4 weeks and were accompanied in the non-XLH monkeys by maternal hyperphosphatemia and placental mineralization (*see Data*). Serum phosphorus levels should be monitored throughout pregnancy [*see Dosage and Administration (2.2)*]. Report pregnancies to the Ultragenyx Adverse Event reporting line at 1-888-756-8657.

The background risk of major birth defects and miscarriage for the indicated population is unknown; however, the estimated background risk in the U.S. general population of major birth defects is 2% to 4% and of miscarriage is 15% to 20% of clinically recognized pregnancies.

Data

Animal Data

In a reproductive toxicity study in pregnant cynomolgus monkeys without XLH, burosumab-twza was administered intravenously once every two weeks from Day 20 of pregnancy to parturition or cesarean section on Day 133, which includes the period of organogenesis, at doses of 1-, 7- and 64-fold human exposure at the adult human dose of 1 mg/kg every 4 weeks. The treatment did not result in teratogenic effects in fetuses or offspring. An increase in late fetal loss, a shortened gestation period, and an increased incidence of preterm births were observed at 64-fold the human exposure at the adult human dose of 1 mg/kg every 4 weeks, concomitant with maternal hyperphosphatemia and placental mineralization. Burosumab-twza was detected in serum from fetuses indicating transport across the placenta. Hyperphosphatemia but no ectopic mineralization was present in fetuses and offspring of dams exposed to 64-fold human exposure at the 1 mg/kg dose every 4 weeks. Burosumab-twza did not affect pre- and postnatal growth including survivability of the offspring.

8.2 Lactation

Risk Summary

There is no information regarding the presence of burosumab-twza in human milk, or the effects of burosumab-twza on milk production or the breastfed infant. Maternal IgG is present in breast milk. However, the effects of local gastrointestinal exposure and limited systemic exposure to burosumab-twza in the breastfed infant are unknown. The lack of clinical data during lactation precludes a clear determination of the risk of CRYSVITA to an infant during lactation. Therefore, the developmental and health benefits of breastfeeding should be considered along with the mother's clinical need for CRYSVITA and any potential adverse effects on the breastfed infant from CRYSVITA or from the underlying maternal condition.

8.4 Pediatric Use

Safety and efficacy of CRYSVITA have been established in pediatric patients 1 year and older. Efficacy in pediatric patients 1 year and older with XLH is based on open label studies of 52 pediatric

patients 5 to 12 years of age with XLH (Study 1), and in 13 pediatric patients 1 to 4 years of age with XLH (Study 2) evaluating serum phosphorus and radiographic findings. Efficacy in adolescents is supported by studies in pediatric patients less than 13 years of age. Dosing in this age group was derived using modeling and simulation of adult and pediatric PK and PD data.

Safety and efficacy for CRYSVITA in pediatric patients with XLH below the age of 1 have not been established [see *Adverse Reactions* (6.1) and *Clinical Studies* (14)].

8.5 Geriatric Use

Clinical studies of CRYSVITA did not include sufficient numbers of patients aged 65 and over to determine whether they respond differently from younger patients. Other reported clinical experience has not identified differences in responses between the elderly and younger patients. In general, dose selection for an elderly patient should be cautious, usually starting at the low end of the dosing range, reflecting the greater frequency of decreased hepatic, renal, or cardiac function, and of concomitant disease or other drug therapy.

10 OVERDOSAGE

There have been no reports of overdose with CRYSVITA. CRYSVITA has been administered in pediatric clinical trials without dose limiting toxicity using doses up to 2 mg/kg body weight with a maximal dose of 90 mg, administered every two weeks. In adult clinical trials, no dose limiting toxicity has been observed using doses up to 1 mg/kg or a maximal total dose of 128 mg every 4 weeks. In non-XLH rabbits and cynomolgus monkeys, ectopic mineralization in multiple tissues and organs was observed at doses of burosumab-twza that resulted in supra-physiologic serum phosphate levels. Adverse effects on bone including reductions in bone mineral density, bone mineralization and bone strength were also observed at exposure greater than human exposure [see *Nonclinical Toxicology* (13.2)].

In case of overdose, it is recommended that serum phosphorus levels, serum calcium levels and renal function be measured immediately and monitored periodically until resolution to normal/baseline levels. In case of hyperphosphatemia, withhold CRYSVITA and initiate appropriate medical treatment.

11 DESCRIPTION

Burosumab-twza is a human immunoglobulin G subclass 1 (IgG1), anti-human fibroblast growth factor 23 (FGF23) antibody produced by recombinant DNA technology using Chinese hamster ovary cells. Burosumab-twza is composed of two heavy chain (γ 1-chain) molecules and two light chain (κ -chain) molecules. Each heavy chain has an N-linked carbohydrate moiety at asparagine 297 (Asn297). The molecular weight of burosumab-twza determined by mass spectrometry is approximately 147,000.

CRYSVITA (burosumab-twza) injection for subcutaneous administration is supplied as a sterile, preservative-free, clear to slightly opalescent and colorless to pale brown-yellow solution in a single-dose vial.

Each 1 mL of solution contains 10 mg, 20 mg or 30 mg of burosumab-twza, L-histidine (1.55 mg), L-methionine (1.49 mg), polysorbate 80 (0.5 mg), D-sorbitol (45.91 mg) in Water for Injection, USP. Hydrochloric acid may be used to adjust to a pH of 6.25.

12 CLINICAL PHARMACOLOGY

12.1 Mechanism of Action

X-linked hypophosphatemia is caused by excess fibroblast growth factor 23 (FGF23) which suppresses renal tubular phosphate reabsorption and the renal production of 1,25 dihydroxy vitamin D. Burosumab-twza binds to and inhibits the biological activity of FGF23 restoring renal phosphate reabsorption and increasing the serum concentration of 1,25 dihydroxy vitamin D.

12.2 Pharmacodynamics

Following SC administration in XLH patients, higher burosumab-twza concentrations were associated with greater increase of serum phosphorus levels. The increase in serum phosphorus was reversible and returned to baseline with elimination of systemic burosumab-twza.

Ratio of renal tubular maximum reabsorption rate of phosphate to glomerular filtration rate (TmP/GFR) showed dose-dependent increases from baseline [see *Clinical Studies* (14)].

Elevation in serum total FGF23 was observed after initiation of burosumab-twza treatment, however, the clinical implication is unknown.

12.3 Pharmacokinetics

The following pharmacokinetic parameters were observed in patients with XLH administered the approved recommended starting dosage based on a 70 kg patient, unless otherwise specified.

Burosumab-twza exhibited linear pharmacokinetics following SC injections within the dose range of 0.1 to 1 mg/kg (0.08 to 0.8 times the maximum approved recommended dosage based on a 70 kg patient).

The steady-state trough mean ($\pm$ SD) concentration of burosumab-twza was 5.8 ($\pm$ 3.4) mcg/mL in adult patients.

Absorption

The burosumab-twza mean T_{max} values ranged from 8 to 11 days.

Distribution

The apparent volume of distribution of burosumab-twza is 8 L.

Elimination

The apparent clearance is 0.290 L/day. The half-life of burosumab-twza is approximately 19 days.

Metabolism

The exact pathway for burosumab-twza metabolism has not been characterized. Burosumab-twza is expected to be degraded into small peptides and amino acids via catabolic pathways.

Specific Populations

No clinical significant difference in burosumab-twza pharmacokinetics was observed based on age.

The effect of renal or hepatic impairment on the pharmacokinetics of burosumab-twza is unknown.

Pediatric Patients

The steady-state trough concentration was 15.8 ($\pm$ 9.4) mcg/mL in patients aged 5-12 years, and 11.2 ($\pm$ 4.6) mcg/mL in patients aged 1-4 years.

Body Weight

Clearance and volume of distribution of burosumab-twza increases with body weight.

Drug Interaction Studies

No drug interaction studies have been conducted with CRYSVITA.

13 NONCLINICAL TOXICOLOGY

13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

The carcinogenic potential of burosumab-twza has not been evaluated in long term animal studies.

Studies have not been performed to evaluate the mutagenic potential of burosumab-twza.

No specific fertility studies have been performed in animals to evaluate the effects of burosumab-twza.

Toxicology studies with burosumab-twza of up to 40 weeks duration in non-XLH cynomolgus monkeys did not show significant adverse effects on female reproductive organs at doses up to 65-fold human exposure at the dose of 1 mg/kg every 4 weeks. In male monkeys, minimal mineralization of the rete testis or seminiferous tubules associated with hyperphosphatemia was observed at 11- to 37-fold human exposure, but semen analysis did not show any adverse effects.

13.2 Animal Toxicology and/or Pharmacology

In rabbits and cynomolgus monkeys, inhibition of FGF23 signaling by burosumab-twza increased serum phosphate and 1,25 dihydroxy vitamin D. Ectopic mineralization in multiple tissues and organs was observed at doses of burosumab-twza that resulted in supra-physiologic serum phosphate levels in the non-XLH animals. In a study in wild type (WT) and hypophosphatemic Hyp mice, a murine model of XLH, ectopic mineralization was markedly less in Hyp mice.

In adult cynomolgus monkeys, burosumab-twza increased bone turnover, mineral content and/or mineral density and cortical thickness at 37- to 65-fold human exposure at the dose of 1 mg/kg every 4 weeks. Adverse effects on bone including reductions in bone mineral density, bone mineralization and bone strength were observed in adult male monkeys at 37- to 47-fold human exposure at the dose of 1 mg/kg every 4 weeks.

In juvenile cynomolgus monkeys, burosumab-twza increased bone turnover, mineral content and/or mineral density and/or cortical thickness at 0.5- to 5-fold clinical pediatric exposure. Bone mineralization was decreased in a male monkey at 5-fold pediatric exposure but there was no effect on bone strength. Burosumab-twza did not affect bone development in juvenile monkeys at doses up to 5-fold pediatric exposure.

14 CLINICAL STUDIES

14.1 Pediatric X-linked Hypophosphatemia

CRYSVITA has been evaluated in 65 pediatric patients with XLH.

Study 1 (NCT 02163577) is a randomized, open-label study in 52 prepubescent XLH patients, 5 to 12 years old, which compared treatment with CRYSVITA administered every 2 weeks versus every 4 weeks. Following an initial 16-week dose titration phase, patients completed 48-weeks of treatment with CRYSVITA every 2 weeks. All 52 patients completed at least 64 weeks on study; no patient discontinued. Burosumab-twza dose was adjusted to target a fasting serum phosphorus concentration of 3.5 to 5.0 mg/dL based on the fasting phosphorus level the day of dosing. Twenty-six of 52 patients received CRYSVITA every two weeks up to a maximum dose of 2 mg/kg. The average dose was 0.73 mg/kg (range: 0.3, 1.5) at week 16, 0.98 mg/kg (range: 0.4, 2.0) at week 40 and 1.04 mg/kg (range: 0.4, 2.0) at week 60. The remaining 26 patients received CRYSVITA every four weeks. At study entry, the mean age of patients was 8.5 years and 46% were male. Ninety-six percent had received oral phosphate and active vitamin D analogs for a mean (SD) duration of 7 (2.4) years. Oral phosphate and active vitamin D analogs were discontinued prior to study enrollment. Ninety-four percent of patients had radiographic evidence of rickets at baseline.

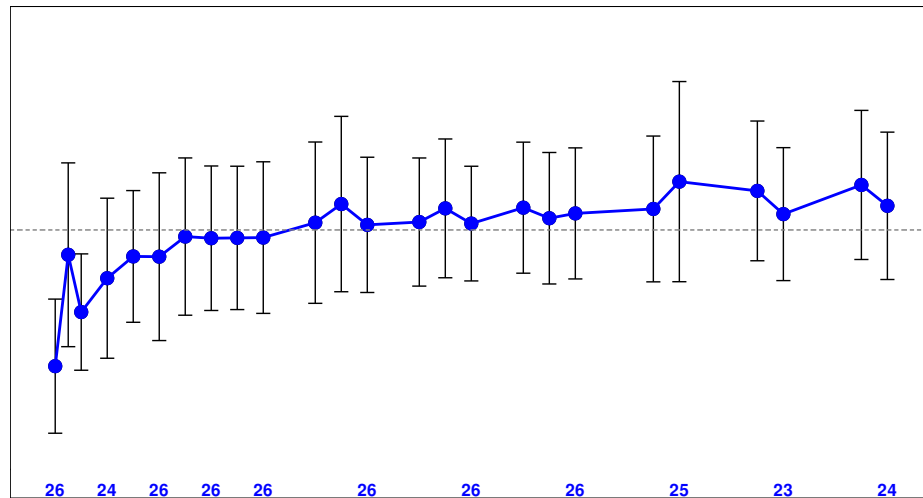
Study 2 (NCT 02750618) is a 64-week open-label study in 13 pediatric XLH patients, 1 to 4 years old. Patients received CRYSVITA at a dose of 0.8 mg/kg every two weeks with titration up to 1.2 mg/kg based on serum phosphorus measurements. All patients completed at least 40 weeks on study; no patients discontinued. At study entry, the mean age of patients was 2.9 years and 69% were male. All patients had radiographic evidence of rickets at baseline and had received oral phosphate and active vitamin D analogs for a mean (SD) duration of 16.9 (13.9) months. Oral phosphate and active vitamin D analogs were discontinued prior to study enrollment.

Serum Phosphorus

In Study 1, CRYSVITA increased mean (SD) serum phosphorus levels from 2.4 (0.40) at baseline to 3.3 (0.40) and 3.4 (0.45) mg/dL at week 40 and week 64 in the patients who received CRYSVITA every 2 weeks ([Figure 1](#)). The ratio of renal tubular maximum reabsorption rate of phosphate to glomerular filtration rate (TmP/GFR) increased in these patients from mean (SD) of 2.2 (0.49) at baseline to 3.3 (0.60) and 3.4 (0.53) mg/dL at week 40 and week 64.

In Study 2, CRYSVITA increased mean (SD) serum phosphorus levels from 2.5 (0.28) mg/dL at baseline to 3.5 (0.49) mg/dL at week 40.

Figure 1: Serum Phosphorus Levels (mg/dL) Over Time in Children 5-12 Years Receiving CRYSVITA Every 2 Weeks in Study 1^a



a) Serum Phosphorus Level (mg/dL) (Mean $\pm$ SD) - Q2W. The dotted line represents the lower limit of normal (3.2 mg/dL) for patients in Study 1.

Radiographic Evaluation of Rickets

Radiographs from 52 CRYSVITA-treated XLH patients in Study 1 and 13 patients in Study 2 were examined to assess XLH-related rickets using the 10-point Thatcher Rickets Severity Score (RSS) and the 7-point Radiographic Global Impression of Change (RGI-C). The RSS score is assigned based on images of the wrist and knee from a single timepoint, with higher scores indicating greater rickets severity. The RGI-C score is assigned based on side-by-side comparisons of wrist and knee radiographs from two timepoints, with higher scores indicating greater improvement in radiographic evidence of rickets. A RGI-C score of +2.0 was defined as radiographic evidence of substantial healing.

In Study 1, baseline mean (SD) RSS total score was 1.9 (1.17) in patients receiving CRYSVITA every two weeks. After 40 weeks of treatment with CRYSVITA, mean total RSS decreased from 1.9 to 0.8 (see [Table 6](#)). After 40 weeks of treatment with CRYSVITA, the mean RGI-C Global score was +1.7 in patients receiving CRYSVITA every two weeks. Eighteen out of 26 patients achieved an RGI-C score of $\geq +2.0$. These findings were maintained at week 64 as shown in [Table 6](#).

In Study 2, baseline mean (SD) total RSS was 2.9 (1.37) in 13 patients. After 40 weeks of treatment with CRYSVITA, mean total RSS decreased from 2.9 to 1.2 and the mean (SE) RGI-C Global score was +2.3 (0.08). All 13 patients achieved a RGI-C global score $\geq +2.0$. The mean (SE) lower limb deformity as assessed by RGI-C, using standing long leg radiographs, was +1.3 (0.14) (see [Table 6](#)).

Table 6: Rickets Response in Children 1-12 Years Receiving CRYSVITA Every 2 Weeks in Study 1 and Study 2

Endpoint Timepoint	CRYSVITA Every 2 Weeks	
	Study 1 (N=26)	Study 2 (N=13)
RSS Total Score		
Baseline Mean (SD)	1.9 (1.17)	2.9 (1.37)
LS Mean change from baseline in total score ^a (reduction indicates improvement) with 95% CI		
Week 40	-1.1 (-1.28, -0.85)	-1.7 (-2.03, -1.44)
Week 64	-1.0 (-1.2, -0.79)	
RGI-C Global Score		
LS Mean score ^a (positive indicates healing) with 95% CI		
Week 40	+1.7 (+1.48, +1.84)	+2.3 (+2.16, +2.51)
Week 64	+1.6 (+1.34, +1.78)	

a) The estimates of LS means and 95% CI (confidence interval) are from the generalized estimation equation model accounting for baseline RSS, visits and regimen and its interaction for Study 1 and from ANCOVA model accounting for age and baseline RSS for Study 2.

Serum Alkaline Phosphatase Activity

For Study 1, mean (SD) serum total alkaline phosphatase activity was 462 (110) U/L at baseline and decreased to 354 (73) U/L at Week 64 (-23%, $p < 0.0001$) in the patients who received CRYSVITA every 2 weeks.

For Study 2, mean (SD) serum total alkaline phosphatase activity was 549 (194) U/L at baseline and decreased to 335 (88) U/L at Week 40 (mean change: -36%).

Growth

In Study 1, CRYSVITA treatment for 64 weeks increased standing mean (SD) height Z score from -1.72 (1.03) at baseline to -1.54 (1.13) in the patients who received CRYSVITA every two weeks (LS mean change of +0.19 (95% CI: 0.09 to 0.29)).

14.2 Adult X-linked Hypophosphatemia

Study 3 (NCT 02526160) is a randomized, double-blind, placebo-controlled study in 134 adult XLH patients. The study comprises a 24-week placebo-controlled treatment phase. CRYSVITA was administered at a dose of 1 mg/kg every 4 weeks. At study entry, the mean age of patients was 40 years (range 19 to 66 years) and 35% were male. All patients had skeletal pain associated with XLH/osteomalacia at baseline. The baseline mean (SD) serum phosphorus concentration was below the lower limit of normal at 1.98 (0.31) mg/dL. Oral phosphate and active vitamin D analogs were not allowed during the study. One patient in the CRYSVITA group discontinued treatment.

Study 4 (NCT 02537431) is a 48-week, open-label, single-arm study in 14 adult XLH patients to assess the effects of CRYSVITA on improvement of osteomalacia as determined by histologic and histomorphometric evaluation of iliac crest bone biopsies. Patients received 1 mg/kg CRYSVITA every four weeks. At study entry, the mean age of patients was 40 years (range 25 to 52 years) and 43% were male. Oral phosphate and active vitamin D analogs were not allowed during the study.

Serum Phosphorus

In Study 3 at baseline, mean (SD) serum phosphorus was 1.9 (0.32) and 2.0 (0.30) mg/dL in the placebo and CRYSVITA groups respectively. During the initial 24 weeks of treatment, mean (SD) serum phosphorus across the midpoints of dose intervals (2 weeks post dose) was 2.1 (0.30) and 3.2 (0.53) mg/dL in the placebo and CRYSVITA groups, and mean (SD) serum phosphorus across the ends of dose intervals was 2.0 (0.30) and 2.7 (0.45) mg/dL in the placebo and CRYSVITA groups.

A total of 94% of patients treated with CRYSVITA achieved a serum phosphorus level above the lower limit of normal (LLN) compared to 8% in the placebo group through week 24 ([Table 7](#)).

Table 7: Proportion of Adult Patients Achieving Mean Serum Phosphorus Levels Above the LLN at the Midpoint of the Dose Interval in Study 3

	Placebo (N = 66)	CRYSVITA (N = 68)
Achieved Mean Serum Phosphorus > LLN Across Midpoints of Dose Intervals Through Week 24 - n (%)	5 (8%)	64 (94%)
95% CI	(3.3, 16.5)	(85.8, 97.7)
p-value ^a		< 0.0001

The 95% CIs are calculated using the Wilson score method.

^a P-value is from Cochran-Mantel-Haenszel (CMH) testing for association between achieving the primary endpoint and treatment group, adjusting for randomization stratifications.

At baseline, the mean (SD) ratio of renal tubular maximum reabsorption rate of phosphate to glomerular filtration rate (TmP/GFR) was 1.60 (0.37) and 1.68 (0.40) mg/dL in the placebo and CRYSVITA groups respectively. At week 22 (midpoint of a dose interval), mean (SD) TmP/GFR was 1.69 (0.37) and 2.73 (0.75) mg/dL in the placebo and CRYSVITA groups. At week 24 (end of a dose interval), mean (SD) TmP/GFR was 1.73 (0.42) and 2.21 (0.48) mg/dL in the placebo and CRYSVITA groups.

Radiographic Evaluation of Osteomalacia

In Study 3, a skeletal survey was conducted at baseline to identify osteomalacia-related fractures and pseudofractures. Osteomalacia-related fractures are defined as atraumatic lucencies extending across both bone cortices and pseudofractures are defined as atraumatic lucencies extending across one cortex. There were 52% of patients who had either active (unhealed) fractures (12%) or active pseudofractures (47%) at baseline. The active fractures and pseudofractures were predominantly located in the femurs, tibia/fibula, and metatarsals of the feet. Assessment of these active fracture/pseudofracture sites at week 24 demonstrated a higher rate of complete healing in the CRYSVITA group compared to placebo as shown in [Table 8](#). During treatment through week 24, a total of 6 new fractures or pseudofractures appeared in 68 patients receiving CRYSVITA, compared to 8 new abnormalities in 66 patients receiving placebo.

Table 8: Comparison of Fracture Healing with CRYSVITA vs Placebo in Study 3

	Active Fractures		Active Pseudofractures		Total Fractures	
	Placebo n (%)	CRYSVITA n (%)	Placebo n (%)	CRYSVITA n (%)	Placebo n (%)	CRYSVITA n (%)
No. of fractures at baseline	13	14	78	51	91	65
Healed at week 24	0 (0%)	7 (50%)	7 (9%)	21 (41%)	7 (8%)	28 (43%)

Bone Histomorphometry

In Study 4, after 48 weeks of treatment, healing of osteomalacia was observed in ten patients as demonstrated by decreases in Osteoid volume/Bone volume (OV/BV) from a mean (SD) score of 26% (12.4) at baseline to 11% (6.5), a change of -57%. Osteoid thickness (O.Th) declined in eleven patients from a mean (SD) of 17 (4.1) micrometers to 12 (3.1) micrometers, a change of -33%. Mineralization lag time (MLt) declined in 6 patients from a mean (SD) of 594 (675) days to 156 (77) days, a change of -74%.

16 HOW SUPPLIED/STORAGE AND HANDLING

CRYSVITA (burosumab-twza) injection for subcutaneous administration is supplied as a sterile, preservative-free, clear to slightly opalescent and colorless to pale brown-yellow solution. The product is available as one single-dose vial per carton in the following strengths:

10 mg/mL (NDC# 69794-102-01)

20 mg/mL (NDC# 69794-203-01)

30 mg/mL (NDC# 69794-304-01)

CRYSVITA vials must be stored in the original carton until the time of use under refrigerated conditions at 36°F to 46°F (2°C to 8°C). Keep CRYSVITA vial in the original carton to protect from light until time of use.

Do not freeze or shake CRYSVITA.

Do not use CRYSVITA beyond the expiration date stamped on the carton.

CRYSVITA vials are single-dose only. Discard any unused product.

17 PATIENT COUNSELING INFORMATION

Hypersensitivity Reactions

Advise patients that CRYSVITA may cause hypersensitivity events such as rash, injection site rash and urticaria. Instruct the patients to contact their physician if such reactions occur [see *Adverse Reactions* (6.1)].

Injection Site Reactions

Inform patients that injection site reactions (e.g. erythema, rash, swelling, bruising, pain, pruritus, urticaria, and hematoma) have occurred at the site of CRYSVITA injection. Instruct the patients to contact their physician if such reactions occur [*see Adverse Reactions (6.1)*].

Restless Leg Syndrome

Advise patients that CRYSVITA can induce RLS or worsen the symptoms of existing RLS. Instruct the patients to contact their physician if such a reaction occurs [*see Adverse Reactions (6.1)*].

Pregnancy

Report pregnancies to the Ultragenyx Adverse Event reporting line at 1-888-756-8657 [*see Use in Specific Populations (8.1)*].

Manufactured by:
Ultragenyx Pharmaceutical Inc.
Novato, CA 94949
U.S. License No. 2040

Distributed by:
Ultragenyx Pharmaceutical Inc.
Novato, CA 94949 USA



SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

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CAROLINA MERCEDES DAZA MONTALVO

CC: 66.783.790

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Patente PCT

COMPOSICIONES FARMACÉUTICAS QUE COMPRENDEN ANTICUERPOS ANTI-FGF23

Detalle del pago

Id.	Rentístico	Concepto y Servicio	Cant.	Val. Unit.	Subtotal
1	50005-01-01	Solicitud examen de patentabilidad Patente de Invención (DESCUENTO INTERNET)	1	\$ 1,053,500	\$ 1,053,500
TOTAL					\$ 1,053,500