LAPaL
THE LONG-ACTING THERAPEUTICS PATENTS AND LICENCES DATABASE

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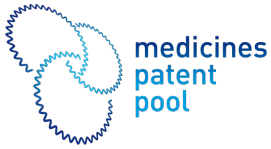


STARSILON Transdermal Patch

Based on public information

Developer(s)

Starton Therapeutics, Inc.

Originator

https://www.startontx.com

United States

Starton Therapeutics, a clinical-stage biotechnology enterprise established in 2017, is dedicated to advancing cancer treatment paradigms. The company's core focus is the development of innovative continuous delivery systems to augment existing cancer therapies. This technological approach aims to provide uninterrupted therapeutic exposure for patients with cancer.

Sponsor(s)

No sponsor indicated

Partnerships

Haisco Pharmaceuticals, Inc.

https://en.haisco.com

Healthwell Acquisition Corp.

https://healthwellspac.com/

Technology information

Type of technology

Polymer-based particles, Transdermal patch

Administration route

Subcutaneous, Transdermal

Development state and regulatory approval

Active Pharmaceutical Ingredient (API)

Olanzapine

Development Stage

Phase II

Regulatory Approval

US Food and Drug Administration (FDA) has cleared an investigational new drug (IND) application for STAR-OLZ in Chemotherapy in 2022.

Description

The STARSILON long-acting transdermal patch is a self-administered dosage form that disperses the drug locally in a controlled fashion. This transdermal patch has the potential to modulate pharmacokinetic parameters, including reduced area under the curve (AUC), peak concentration (Cmax), and overall drug exposure. This approach presents opportunities for enhanced therapeutic efficacy and tolerability, as well as the exploration of novel indications or superior outcomes within established treatment areas.

Technology highlight

• Self-administered transdermal formulation and injectable options that provide controlled drug release for at least five days • Potential to have a lower incidence of dose-limiting side effects • Elimination of subtherapeutic drug levels due to short half-life APIs

Technology main components

• Pressure Sensitive Adhesive (Eg: Styrene - Butadiene - Styrene) • Solubilization Agent / Crystallization Inhibitor (Eg: uncrosslinked polyvinylpyrrolidone (PVP)) • Thickener (Eg: cassia tora , collagen , gelatin , gellum gum , guar gum , pectin , potassium , or sodium carageenan , tragacanth , xantham , gum copal, chitosan , resin semisynthetic polymers and its derivatives: methylcellulose , ethyl cellulose , carboxymethyl cellulose , hydroxylpropyl cellulose (Klucel HF)) • Skin Permeation Enhancer (Eg: oleic acid , oleyl alcohol) • Skin Modifiers (Eg: butylated hydroxytoluene; butylated hydroxyanisole) • Polar Aprotic Solvent (Eg: n - methyl - 2 - pyrrolidone (NMP)) • Backing layer (Eg: Scotchpak® 1012) • Release Liner (Eg: Bio - Release® liner) • Penetration enhancers

Information on the raw materials sourcing, availability and anticipated price

Raw materials for formulation include polyvinylpyrrolidone (PVP) sourced from BASF Pharma, hydroxypropyl cellulose (Klucel HF) from Ashland, carbomer (Carbopol) from Lubrizol Corporation, colloidal silicon dioxide (AEROSIL) and acrylic polymers (Eudragit) from Evonik Corporation, and polyoxyethylene glycol ether (Brij) from B.J. Bridge. The projected cost of the final product remains undisclosed at this time.

Delivery device(s)

Not provided

APIs compatibility profile

API desired features

Water-soluble molecules

Water-insoluble molecules

Small molecules

Immunomodulatory agents such as thalodomide, lenalidomide, pomalidomide, iberdomide in combination with dexamethasone, Dronabinol, apremilast analogs , apremilast derivatives , apremilast metabolites , and combinations thereof are targeted for this dosage form.

Additional solubility data

Not provided

Additional stability data

Not provided

API loading: Maximum drug quantity to be loaded

Not provided

API co-administration

2 different APIs : Not provided

LogP

Not provided

Scale-up and manufacturing prospects

Scale-up prospects

Not provided

Tentative equipment list for manufacturing

• Mixing Apparatus • Laminating Machine • Drying oven • Die-Cutting Machine • Solvent Evaporation System

Manufacturing

ISO Class 7 or 8 with HEPA filters. Manufacturing process includes: • Hot melt extrusion process • Pretreatment Composition • Blend Preparation • Coating

Specific analytical instrument required for characterization of formulation

• HPLC • Gas Chromatographly (GC) • Differential Scanning Calorimetry (DSC) • Fourier-Transform Infrared Spectroscopy (FTIR) • UV-Visible Spectroscopy • Scanning Electron Microscopy • Tensile Testing Equipment

Clinical trials

STAR LLD MM 023

Identifier

NCT06087653

Link

https://clinicaltrials.gov/study/NCT06087653

Phase

Phase I/II

Status

Recruiting

Sponsor

Starton Therapeutics, Inc

More details

Primary Objective • Assess the safety and tolerability of low-dose lenalidomide administered by continuous subcutaneous (SC) infusion (STAR-LLD) in combination with dexamethasone and a proteasome inhibitor (PI). Secondary Objectives * To assess the immunologic activity of natural killer (NK) cells and T cells for innate and humoral immunity. * To establish the pharmacokinetic (PK) profile of STAR-LLD at a defined infusion rate targeting steady-state blood concentrations. * To determine pharmacodynamic (PD) changes with STAR-LLD in a panel of biomarkers associated with clinical response to lenalidomide. * Evaluate changes in efficacy indicators including objective response rate (ORR), progression-free survival (PFS), and duration

of response (DOR).

Purpose

Safety, Efficacy, and Pharmacokinetics of Continuous Subcutaneous Lenalidomide in Multiple Myeloma (MM)

Interventions

Intervention 1

Lenalidomide + Dexamethasone + Bortezomib

Countries

United States of America

Sites / Institutions

Not provided

Trials dates

Anticipated Start Date

Not provided

Actual Start Date

2023-10-02

Anticipated Date of Last Follow-up

2023-10-11

Estimated Primary Completion Date

2024-07-01

Estimated Completion Date

2024-09-01

Actual Primary Completion Date

Not provided

Actual Completion Date

Not provided

Studied populations

Age Cohort

- Adults
- Older Adults

Genders

- All

Accepts pregnant individuals

Unspecified

Accepts lactating individuals

Unspecified

Accepts healthy individuals

No

Comments about the studied populations

Inclusion Criteria: 1. Male or female ≥18 years at the time of informed consent. 2. Autologous stem cell transplant (ASCT) ineligible. 3. SARS -CoV2 virus (COVID)-19 negative. 4. A prior diagnosis of MM as defined by International Myeloma Working Group (IMWG) criteria (Appendix 7). 5. Documented measurable disease following first line therapy defined as: * Serum monoclonal protein ≥1.0 g/dL by protein electrophoresis. * ≥200 mg/24 hours of monoclonal protein in the urine on 24-hour electrophoresis. * Serum free light chain (SFLC) ≥10 mg/dL AND abnormal serum kappa to lambda free light chain (FLC) ratio. 6. Intended to be treated in 2nd line or greater with lenalidomide, dexamethasone, and a PI.

Health status

Not provided

Study type

Interventional (clinical trial)

Enrollment

6

Allocation

Not provided

Intervention model

Single group assignment

Intervention model description

Not provided

Masking

Open label

Masking description

Not provided

Frequency of administration

Weekly

Studied LA-formulation(s)

Non-Implantable Device
Other(s) : "Transdermal Patch "

Studied route(s) of administration

Subcutaneous
Transdermal

Use case

Treatment

Key resources

Not provided

Excipients

Proprietary excipients used

No proprietary excipient used

Novel excipients or existing excipients at a concentration above Inactive Ingredients Database (IID) for the specified route of administration

No novel excipient or existing excipient used

Residual solvents used

No residual solvent used

Additional features

Other features of the technology

- Drug-eluting
- Monolithic
- Removable
- Reservoir-type
- Other(s)

  Ambulatory Subcutaneous pump

Release properties

• The release rate of the API from the transdermal patch is influenced by multiple factors, including drug solubility within the matrix, adhesive type, and the incorporation of permeation enhancers. • Preclinical pharmacokinetic studies comparing lenalidomide delivered transdermally to oral administration demonstrated more consistent drug plasma concentration profiles. • This suggests that transdermal delivery may bypass hepatic first-pass metabolism, potentially enhancing the drug's bioavailability.

Injectability

Not applicable

Safety

Interim results from the Phase 1b STAR-LLD trial (2024) demonstrated no hematologic toxicities exceeding Grade 1 after up to three treatment cycles. Additionally, no drug-related non-hematologic toxicities beyond Grade 1 were observed, with only a single instance of Grade 1 dermatologic toxicity reported across four cumulative cycles.

Stability

STARSILON transdermal patches offer a versatile drug delivery system, capable of providing sustained release from 24 hours up to 15 days. Stability and shelf life of the patch can be optimized through various pharmaceutical strategies, including co-crystal formation, drug coating, and the incorporation of inert protective agents.

Storage conditions and cold-chain related features

Not provided

Potential application(s)

Therapeutic area(s)

Oncology

Mental health

Use case(s)

Treatment

Use of technology

Ease of administration

- Administered by a community health worker
- Administered by a nurse
- Administered by a specialty health worker
- Self-administered

Frequency of administration

Every 5 days

User acceptance

Not provided

Targeted user groups

Age Cohort

- Adults
- Older Adults

Genders

- All

Pregnant individuals

Unspecified

Lactating individuals

Unspecified

Healthy individuals

Unspecified

Comment

Not provided

Potential associated API(s)

Olanzapine

Class(es)

Antipsychotic

Development stage

Phase II

Clinical trial number(s)

Not provided

Foreseen/approved indication(s)

Chemotherapy-induced nausea and vomiting (CINV)

Foreseen user group

Not provided

Foreseen duration between application(s)

Once every 5 days

Applications to Stringent Regulatory Authorities (SRA) / regulatory approvals

US Food and Drug Administration (FDA) has cleared an investigational new drug (IND) application for STAR-OLZ in Chemotherapy in 2022.

lenalidomide

Class(es)

CRL4CRBN E3 ubiquitin ligase modulator

Development stage

Phase I

Clinical trial number(s)

Not provided

Foreseen/approved indication(s)

Multiple Myeloma and Chronic Lymphocytic Leukemia

Foreseen user group

Not provided

Foreseen duration between application(s)

Not provided

Applications to Stringent Regulatory Authorities (SRA) / regulatory approvals

A comprehensive data summary for the U.S. Food and Drug Administration (FDA) will be compiled by the company. Additionally, phase II clinical trials are scheduled to commence in 2025.

dronabinol

Class(es)

Antiemetics

Development stage

Pre-clinical

Clinical trial number(s)

Not provided

Foreseen/approved indication(s)

Chemotherapy induced nausea and vomiting

Foreseen user group

Not provided

Foreseen duration between application(s)

Not provided

Applications to Stringent Regulatory Authorities (SRA) / regulatory approvals

Not provided

Ondansetron

Class(es)

Antiemetics

Development stage

Pre-clinical

Clinical trial number(s)

Not provided

Foreseen/approved indication(s)

Not provided

Foreseen user group

Not provided

Foreseen duration between application(s)

Not provided

Applications to Stringent Regulatory Authorities (SRA) / regulatory approvals

Not provided

Thalidomide derivates

Class(es)

Immunomodulatory Imides

Development stage

Pre-clinical

Clinical trial number(s)

Not provided

Foreseen/approved indication(s)

Not provided

Foreseen user group

Not provided

Foreseen duration between application(s)

Not provided

Applications to Stringent Regulatory Authorities (SRA) / regulatory approvals

Not provided

Patent info

Description

Treatment of Vomiting and Nausea with Minimum Dose of Olanzapine

Brief description

Compositions, devices, and methods for transdermal administration of olanzapine and uses thereof, e.g., to treat nausea and vomiting.

Representative patent

US20240189251A1

Category

Formulation

Patent holder

Starton Therapeutics, Inc.

Exclusivity

Not provided

Expiration date

February 20, 2044

Status

Granted

Description

Transdermal delivery of dronabinol

Brief description

Provided is a transdermal drug delivery system comprising dronabinol. The dronabinol transdermal delivery system provides a drug plasma concentration at predetermined rate for a predetermined period of time, offering a simplified therapeutic regimen by decreasing dosing frequency for the treatment and/or prevention of nausea and/or vomiting associated with, for example, chemotherapy.

Representative patent

US20210236417A1

Category

Formulation

Patent holder

Starton Therapeutics, Inc.

Exclusivity

Not provided

Expiration date

April 7, 2041

Status

Granted

Description

Ondansetron In-adhesive Transdermal Patch

Brief description

Drug-in-adhesive transdermal patches for the administration of the ondansetron are described. The patches find use, for example, to treat chemotherapy induced nausea and vomiting (CINV), which requires a high initial flux in the acute phase that is sustained over multiple days or weeks. Embodiments of the disclosure relate in part to formulations for manufacturing self-adhesive patches that include various combinations of a variety of advantageous components, which can be tailored to treat various patient groups or symptoms.

Representative patent

WO2020118091A!

Category

Formulation

Patent holder

Starton Therapeutics, Inc.

Exclusivity

Not provided

Expiration date

December 5, 2019

Status

Granted

Description

Transdermal drug delivery systems for administration of a therapeutically effective amount of lenalidomide and other immunomodulatory agents

Brief description

Transdermal drug delivery systems and methods of fabricating such systems are provided. The active pharmaceutical ingredient can be lenalidomide or other immunomodulatory agents. More particularly, the present invention is directed to improving the solubility of lenalidomide and other immunomodulatory imide compounds and improving the permeation of such compounds through the skin.

Representative patent

EP4351536A1

Category

Not provided

Patent holder

Starton Therapeutics, Inc.

Exclusivity

Not provided

Expiration date

Not provided

Status

Pending

Supporting material

Publications

There are no publication

Additional documents

- Poster Presentation of Safety and efficacy studies of STAR-LLD (lenalidomide Transdermal Patch)

Useful links

- News related to STARSILON skin patch administration in Multiple myeloma

Access principles

Collaborate for development

Consider on a case by case basis, collaborating on developing long acting products with potential significant public health impact, especially for low- and middle-income countries (LMICs), utilising the referred to long-acting technology

Not provided

Share technical information for match-making assessment

Provide necessary technical information to a potential partner, under confidentiality agreement, to enable preliminary assessment of whether specific medicines of public health importance in LMICs might be compatible with the referred to long-acting technology to achieve a public health benefit

Not provided

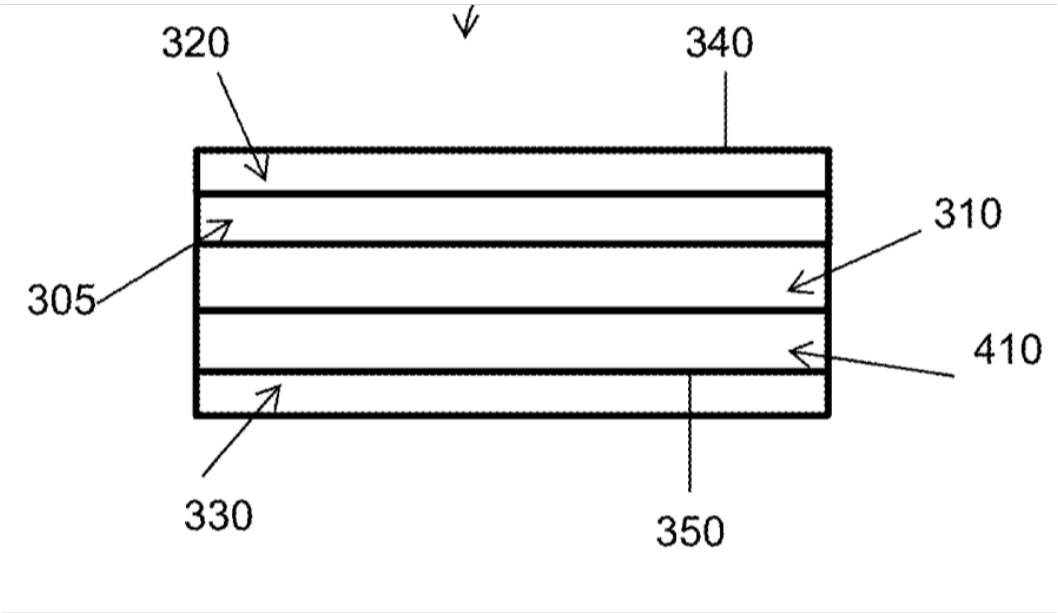
Work with MPP to expand access in LMICs

In the event that a product using the referred to long-acting technology is successfully developed, the technology IP holder(s) will work with the Medicines Patent Pool towards putting in place the most appropriate strategy for timely and affordable access in low and middle-income countries, including through licensing

Not provided

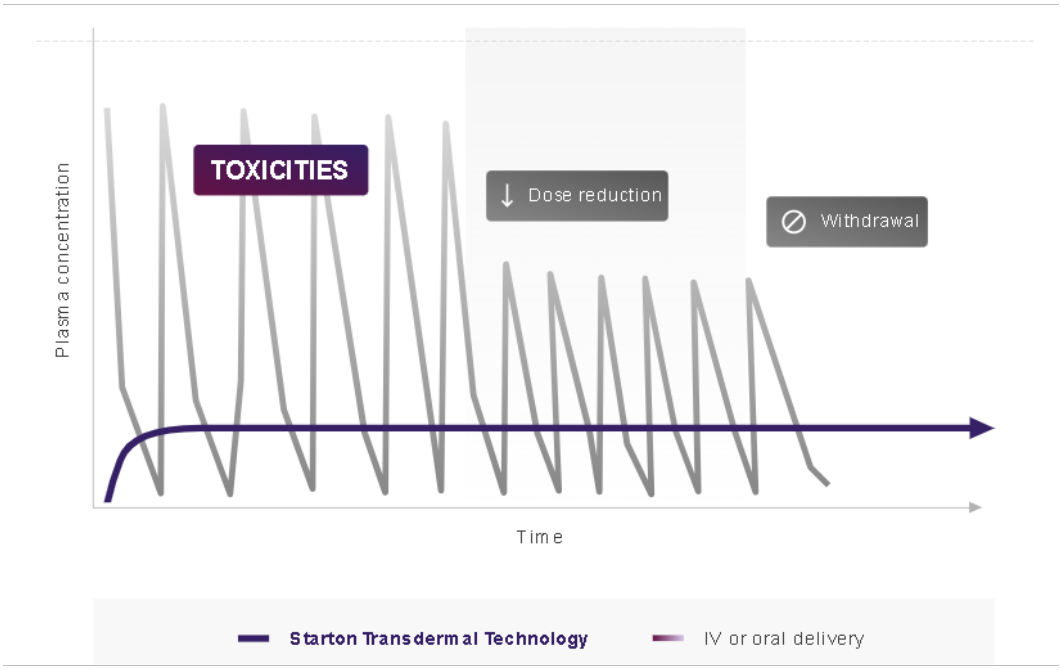
Comment & Information

Illustrations



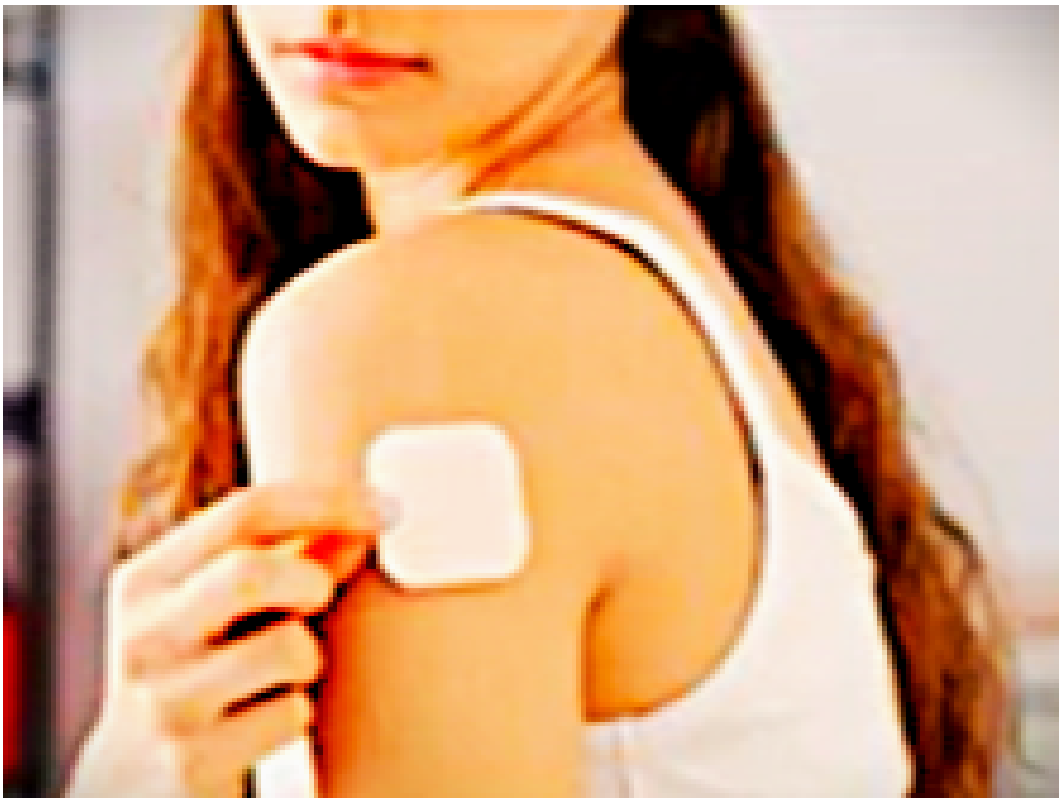
Starsilon Trandermnal patch blueprint

U.S. Patent Application Publication No. 20220395468A1. (2022). Retrieved from https://patentimages.storage.googleapis.com/0c/6d/f6/cf9c3b913cc3e5/US20220395468A1.p



Plasma time curve of Transdermal Drug Delivery System Vs Intravenous

Starton Therapeutics. (n.d.). Pipeline. Retrieved August 8, 2024, from https://www.startontx.com/pipeline/



Starsilon Trandermal Patch

Starton Therapeutics - Precision Blood Cancer Conference September 2021 (March 2015), YouTube. https://www.youtube.com/watch?v=CWzjnNOt934

Subcutaneous Pump

Starton Therapeutics - Precision Blood Cancer Conference September 2021 (March 2015), YouTube. https://www.youtube.com/watch?v=CWzjnNOt934