Tackling Osteoarthritis: Matriptase Inhibitor as a Disease Modifying Therapy

Kevin Buchan

Business Development Manager, LifeArc

Tackling Osteoarthritis

**Osteoarthritis (OA) is the most common joint disorder**

- OA affects approximately 60% of over 65 year olds
  - OA causes pain, joint stiffness and poor mobility
  - OA often reduces independence and quality of life in sufferers

- **Q:What is the cause?**

- **A: Gradual breakdown of cartilage and bone within the affected joints, the most commonly affected being the knees and hips.**

- Current Treatments do not slow the progression of disease

- Prevalence will grow: Age and obesity are risk factors

Tackling Osteoarthritis: Matriptase Inhibitor as a Disease Modifying Therapy(DMT)

- **Our Approach:**

- An effective 'disease-modifying OA drug' would target a detrimental protein present in an OA joint but not the normal joint

- Our research has identified such a protein, an enzyme which promotes cartilage degradation in OA

- **This enzyme is Matriptase**

Mechanism of action of matriptase
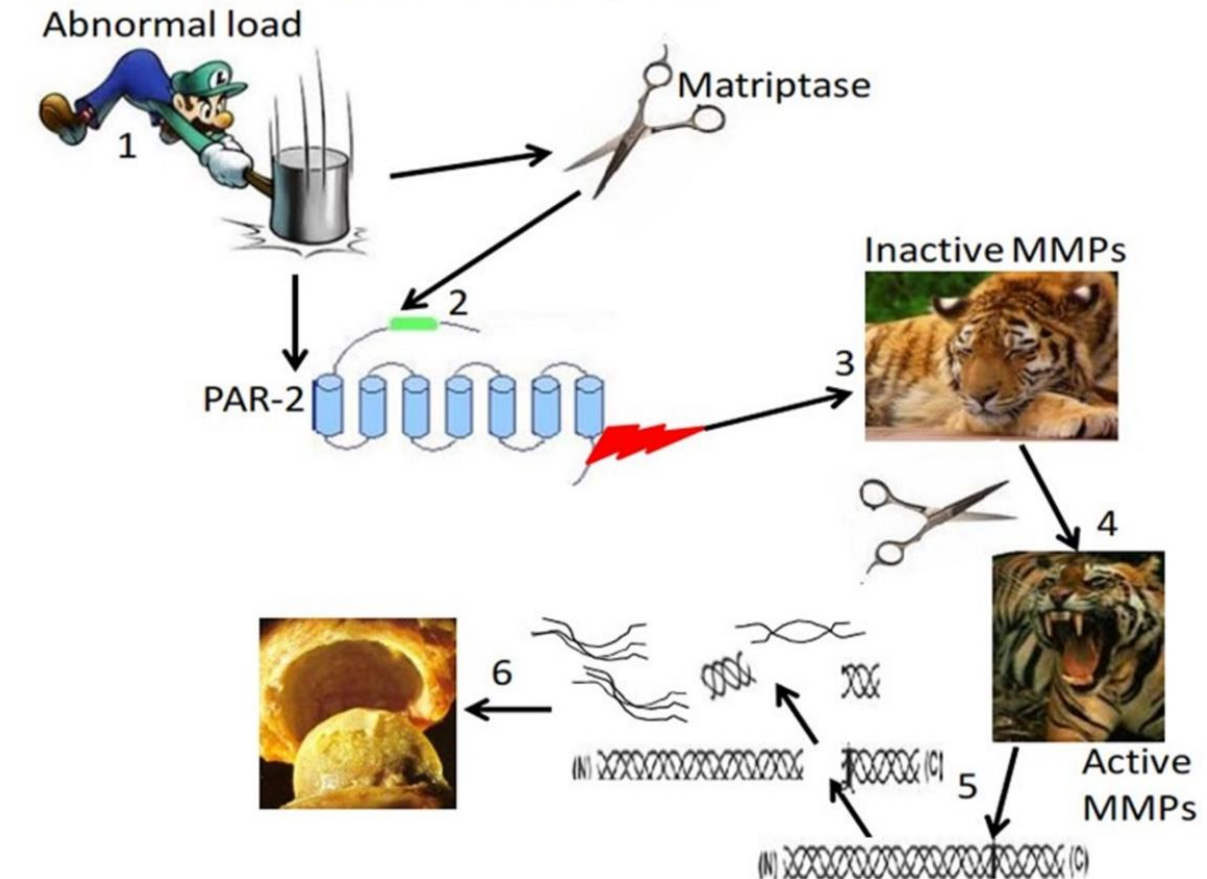
Tackling Osteoarthritis: Matriptase Inhibitor –The Invention

- **Our Approach:**

- **Our research has enabled the validation of matriptase as a therapeutic target for osteoarthritis**

- We have created novel small molecule inhibitors of Matriptase

- Achieve selective targeting of osteoarthritic joint by:

  1. Selection of matriptase as a validated target for diseased joints

  2. Creating molecules with selectivity for Matriptase over other key proteolytic enzymes

  3. Local delivery of matriptase inhibitor to the joint

Tackling Osteoarthritis: Matriptase Inhibitor as a Disease Modifying Therapy (DMT)

- **Commercial Potential:**

- Prevalence is rising. **Diagnosed Prevalent Population (Symptomatic) (7MM), from 36M (2016) to 41M (2026).**

- Market was valued at $1.6 billion in the 7MM in 2016, and is expected to increase to $3.5 billion in 2026

- An effective 'Disease-Modifying OA drug' will deliver structural alteration of the disease linked to clinical benefit

- Our approach is to develop and progress a DMT that will be delivered via *ia* injection into relevant joints at relevant dosages and time intervals

- The launch of new biologic therapies priced at a substantial premium to small-molecule therapies will drive overall market growth

- Local delivery may alleviate some of the cost of goods "headwinds" associated with new disease-modifying therapies

Tackling Osteoarthritis: Matriptase Inhibitor as a DMT

- **Differentiation in the Development pipeline and Market Place:**

- Few Disease Modifying Therapies (DMT) are being developed

- DMT as currently-available therapies offer only symptom relief

- Most "competition" emerges from analgesics with innovative MOAs—including anti-nerve growth factors (anti-NGFs), a new class of opioids (CR845), an intra-articular formulation of capsaicin (CNTX-4975)

- Potential DMT are now in development. These drugs include a small molecule therapy, SM04690, and two cell-based DMT- Invossa and ReJoin

- Evolution of the OA pipeline products will lead to the OA market landscape changing radically over the next 20 years.

- **Our solution: small molecule inhibitors designed to inhibit a target that has DMT potential with systemic effects being limited by local (ia) delivery**

Tackling Osteoarthritis: Matriptase Inhibitor as a DMT

Development Status:

- Composition of matter identified

- Potent inhibitors of Matriptase identified

- Selectivity against key enzymes confirmed

- Some *in vivo* PoC undertaken

- Material could be made available to a commercial partner for practical evaluation

IP status:

- Novel findings are proprietary and unpublished

Matriptase Inhibitor as a DMT: Resources Needed

Next step for development: • Looking for potential partners who wish to conduct diligence/evaluation	**Partners sought:** ▪ Licensees sought ▪ Global rights available ▪ Rights granted could be based on territories (Asia-Pacific ;US & European) ▪ Ideal partner would take project to human PoC

Contact Details

Dr Kevin Buchan

Business Development Manager, LifeArc

T: +44 (0) 1438 544565

M: +44 (0) 7545 421 335

kevin.buchan@lifearc.org