



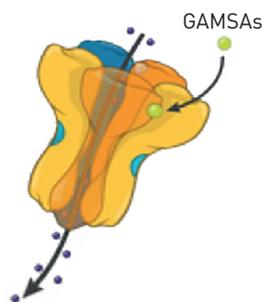
## UNLOCKING NEW POTENTIAL IN WOMEN'S HEALTH

We are a Swedish speciality pharma company specializing in Women's Health. With a product pipeline built on over 40 years' research into menstrual-related disorders, we have developed a new generation of safe, efficacious drugs called GAMSAs (GABA<sub>A</sub> Modulating Steroid Antagonists).

GAMSAs have the potential to treat a range of debilitating conditions within women's health that currently have no dedicated treatments, unlocking unrealized potential for millions of women. Our flagship product Sepranolone is the world's first dedicated therapy for PMDD, the most severe form of PMS.

A WHOLE NEW GENERATION OF SAFE, EFFICACIOUS DRUGS

### WHAT ARE GAMSAs?



GAMSAs are a new family of targeted compounds that can normalise GABA<sub>A</sub> receptor activity in the brain, inhibiting the powerful negative effects some people have to certain GABA<sub>A</sub> modulating steroids.

The 40-year research work of our CSO Torbjörn Bäckström (Senior Professor in Obstetrics and Gynaecology Umeå University) has identified in unprecedented detail the exact mechanisms by which certain GABA<sub>A</sub> modulating steroids in the brain powerfully impact our moods and behaviour.

### THE SEPRANOLONE STORY

## A SWEDISH BREAKTHROUGH FOR WOMEN THE WORLD OVER

*The world's first dedicated treatment for PMDD, Sepranolone, has been built on over 40 years' research. Yet it all started in 1972. Before the term "PMDD" even existed.*

Few of us have to confront the actual human behaviour behind medical terms like 'violent mood swings'. But in the summer of 1972 a young volunteer medical student in the North of Sweden did. Torbjörn Bäckström, working weekends in his local psychiatric hospital, became involved in the case of a young woman frequently sectioned by Police for violent outbursts—but always at the same time of month. With the behaviour vanishing the moment her period arrived.

SO BEGAN A 40-YEAR, 400-PAPER RESEARCH JOURNEY UNLOCKING THE REASONS WHY

Today, the mechanism that triggers PMDD has finally been revealed, and the natural compound that modulates and dampens it, identified. The synthesized version of this compound, Sepranolone, is the world's first dedicated treatment for PMDD.

### THE PMDD PIONEER



**NAME** Torbjörn Bäckström

**TITLE** MD, PhD, senior professor Dept. Clinical Science, Obstetrics and Gynaecology, Umeå University, Head of Umeå Neurosteroid Research Center.

**PUBLICATIONS** Over 400 papers on GABA<sub>A</sub> receptors and reproductive hormones

WE BELIEVE GAMSAs WILL CONSTITUTE A NEW GENERATION OF SAFE, TARGETED TREATMENTS—UNLOCKING NEW POTENTIAL AND HELPING GENERATIONS OF WOMEN REMAIN IN CONTROL OF THEIR LIVES.



## REMAIN IN CONTROL OF YOUR LIFE

We're developing a new generation of targeted treatments that will help women realize their full potential—and remain in control of their lives.

## IT'S TIME TO TREAT PMDD

**1-IN-20  
WOMEN**

OF CHILDBEARING  
AGE WORLDWIDE

**SUFFERS  
FROM PMDD**

Premenstrual Dysphoric Disorder (PMDD) is the severest form of PMS, affecting 1-in-20 women of childbearing age worldwide. It's a devastating, hereditary condition that robs millions of their full potential. Sufferers are four times more likely to attempt suicide, often have difficulty holding down a full-time job and are significantly more likely to experience family or relationship breakdowns.

**YET THERE HAS NEVER BEEN A DEDICATED TREATMENT FOR PMDD. UNTIL NOW.**

### FINALLY – HELP FOR THE 1-IN-20

**”** *In the last seven months 526,000 women have visited our website. It shows just how many people now are asking themselves why, at the beginning of the 21st century, is there still no safe, effective treatment developed for PMDD? We're providing just that.*

**Peter Nordkild,**  
CEO Asarina Pharma

**”** *For two weeks every month I was completely incapacitated. I lost jobs, friends and relationships, suffered anger, depression and mood swings. When I first saw a description of PMDD it was like a lightbulb switching on... Finally, I thought, I'm not alone. Finally, I can begin to take back control!*

**'Lisa', 37, UK**

### SEPRANOLONE: THE WORLD'S FIRST DEDICATED THERAPY FOR PMDD

Sepranolone is an endogenous compound that occurs naturally in the brain. It's neither an anti-depressant nor a hormone. Sepranolone inhibits the effects of allopregnanolone, the specific neuro-steroid that causes PMDD symptoms. Because of its high specificity and tolerability Sepranolone has very low risk of side-effects.

IN PHASE IIA CLINICAL  
TESTS SEPRANOLONE  
REDUCED KEY PMDD  
SYMPTOMS BY  
OVER 80 %

## SEPRANOLONE FOR MENSTRUAL MIGRAINE

### PREVENTION IS THE BEST CURE

Migraine is more prevalent than diabetes, epilepsy and asthma combined. And, beginning at puberty, three times more women than men suffer from it. Over 1-in-5 (22 %) of those women suffer from menstrual migraine specifically. And because menstrual migraine is more predictable than regular migraine (occurring in the two days leading up to and three days into a period), it is rarely treated as chronic, even though attacks last longer than regular attacks (up to five days) and often have more severe symptoms.

PHASE IIA TRIALS  
OF SEPRANOLONE FOR  
MENSTRUAL MIGRAINE  
WILL BEGIN IN THE FIRST  
HALF OF 2019

**20 %** of women migraine sufferers suffer specifically from Menstrual Migraine

**3X** more women than men suffer from migraine (1-in-4 women)

**2017–2022** the number of women with Menstrual Migraine in the US predicted to increase

**150–500 MUSD** forecast potential gross revenues in the US from Menstrual Migraine treatment

**150 MUSD** from refractory Menstrual Migraine patients

The role of sex hormones in menstrual migraine is undisputed. (Up until puberty migraine affects both sexes equally. It's only following menses that the prevalence amongst women triples). In fact, menstrual migraine is triggered by the same hormone metabolite that triggers PMDD—Allopregnanolone, and so, we believe, would respond to the same Asarina Pharma treatment: Sepranolone.

Present treatments stop symptoms *once they have started occurring*. Sepranolone however would be a preventative cure, actually preventing migraine attacks from occurring, instead of just treating symptoms. For women managing menstrual migraine over a lifetime this would be a powerful new treatment for remaining in control of their life.

## OUR PIPELINE

Asarina Pharma is advancing a robust portfolio of products, to become a leading speciality pharma company within the area of Women's Health. Our pipeline is based on over 40 years' world-class research into GABA hormones by CSO and founder Torbjörn Bäckström (MD, PhD).

Prof Bäckström has published 400 papers on the effect of sex and stress hormones, in particular on the range of conditions induced by the impact of hormones in the GABA<sub>A</sub> receptor platform.

### GAMSAS: NEW TREATMENTS UNLOCKING NEW POTENTIAL

GAMSAs (GABA<sub>A</sub> Modulating Steroid Antagonists) are a new family of antagonist compounds that inhibit the negative effects of GABA<sub>A</sub> modulating steroids in the GABA system—the Central Nervous System's general mood modulating system.

GAMSAs have the potential to constitute a new generation of safe, targeted therapies for Women's Health, mood disorders and conditions that span the two—from PMDD and Menstrual Migraine to Tourette's and Essential Tremor.

### THE FLAGSHIP PRODUCT

The company's flagship product Sepranolone inhibits the Positive Allosteric Modulation (PAM) effects of Allopregnanolone on the GABA<sub>A</sub> receptor. A heightened sensitivity to Allopregnanolone causes PMDD. By fine tuning the receptor activity, with high selectivity and without overstimulation, Sepranolone produces minimal off-target side-effects.

#### Electrical current (patch clamp experiment)

