BACHEM

Melusine® Venom Libraries

Designed to discover tomorrow's drugs

compound libraries

unexplored collections

pre-fractionated venoms

ready-made for HTS lead discovery

www.bachem.com/melusine

Melusine Venom Libraries are high quality venoms prepared and pre-fractionated on an automated platform and dispensed in microplates ready for high throughput screening (HTS) in targeted lead discovery projects.

Melusine is the world's largest collection of animal venoms. Our catalog offers a selection of 600 venoms (snakes, scorpions, spiders, ants, bees, wasps, frogs, toads, salamanders, cone snails, sea anemones, jellyfishes, soft corals, gorgonians, and stonefishes) and 200 insect hemolymphs.

From Venoms to Drugs

While venomous animals are often considered a lethal threat, venom components can cure life-threatening disorders. Animal venoms are complex biofluids made of hundreds of bioactive peptides and proteins that have naturally evolved to generate highly selective, potent, and stable biomolecules. These ready-made biologics represent a goldmine for the discovery of lead products to target ion channels, receptors, enzymes, cells, or living organisms.

There are already five venom-derived peptide drugs on the market (see Table 1 below) and many more are currently undergoing preclinical or clinical development for the treatment of various indications such as cancer, pain, multiple sclerosis, stroke, allergies, diabetes, and microbial infections.

Advantages of Melusine Venom Libraries

Ready for high throughput screening

Venoms in the Melusine Venom Libraries are pre-fractionated into microplates ready for high throughput screening (HTS).

Each 96-well microplate contains one venom in 80 fractions with 16 blank wells. Each venom has approximately 500 molecules. Each well typically contains 5-20 molecules for primary screens. Bioactive compounds are at an estimated concentration of 0.5-5 micromolar (µM) when dissolved in 50-100 microliters (µL). The fractions have been designed to have activity in the nanomolar (nM) or picomolar (pM) levels in primary screens. In addition, we also offer 384-well microplates containing 4 venoms.

Each microplate comes with:

- Material Safety Data Sheet (MSDS)
- Certificate of Analysis (CoA) that includes a RP-HPLC profile and a matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOF) mass spectrum of the crude venom with a list of detected molecular masses
- Excel spreadsheet for hit follow-up

Table 1 - Examples of succesful drug development starting from venoms

Company	Drug	Molecule	Species	Target	Disease
Amylin & Eli Lilly	Exenatide (Byetta®)	Peptide (natural)	Heloderma suspectum (Gila monster)	GLP-1 receptor	Type-2 diabetes
Bristol-Myers-Squibb	Capoten (Captopril®)	Peptidomimetic	Bothrops jararaca (Brazilian lancehead)	Angiotensin converting enzyme	Hypertension
COR Therapeutics	Integrilin (Eptifibatide®)	Cyclic peptide	Sistrurus millarius barbouri (Southeastern pygmy rattlesnake)	Platelet aggregation (GPIIb/IIIa)	Ischemic stroke
Elan Corporation	Ziconotide (Prialt®)	Mini-protein (natural)	Conus magus (Magician's cone)	N-type voltage-gated Ca^{2+} channel	Severe chronic pain
Medicure Pharma & Merck	Tirofiban (Aggrastal®)	Peptidomimetic	Echis carinatus (Saw-scaled viper)	Platelet aggregation (GPIIb/IIIa)	Angina & infarction

Guaranteed re-supply

Re-supply on a per-well or per-venom basis is guaranteed for twelve months.

Customizable for you

We can make a customized venom library just for you. You can choose a specific group of venomous animals on which to focus your lead discovery research, or we can help you select venoms with a potentially higher hit-to-lead rate for a given target or target type. Furthermore, we offer customized microplate formats including aliquoting larger amounts of material (2x, 4x, 10x), applying a molecular weight cut-off for proteins, or enriching for small molecules (≤1000 Da). Venoms can also be dispensed in a layout to suit your needs.

World-class expertise

Melusine Venom Libraries are produced by Atheris Laboratories and exclusively distributed by Bachem. Atheris Laboratories has over 15 years experience investigating natural compounds from a variety of venomous organisms and other natural sources. They have built a world-class expertise pertaining to the extraction, isolation, purification, characterization, and synthesis of bioactive compounds.

Save time & money

Melusine Venom Libraries' known biological activities save time. Our extensive ToxEnter database can focus your search on venoms with desired clinical effects. Venom peptides are generally targeted at a specific receptor and thus exhibit few cross-reactions. Because of their high potency, only minute quantities of venom peptides are needed to exert their biological effects. This often translates to lower manufacturing costs as compared to less potent compounds.

Analytical support

In addition, Atheris Laboratories has developed an integrated venomics platform that combines bioactivity-guided, computer-assisted, and structure-driven approaches to advance your HTS process. These analytical services are offered on a fee-for-service basis or under R&D agreements with Atheris.

Melusine Venom Collections

Common Venom Discovery Collections

These collections include a selection of common venoms from a wide variety of animals. This gives you the potential to discover compounds with the highest possible success rate and to generate innovative leads. We have collections with 4, 12, 24, or 48 different venoms.

Rare Venom Discovery Collections

These collections include at least 50% of rare* venoms. We offer collections containing 4, 12, 24, 60, or 100 venoms. This broad variety of selected venoms gives you the potential to discover compounds with the highest possible success rate and to generate highly innovative leads.

Rare Spider Venom Collections

These collections include only rare* spider venoms. These spider venoms have been selected to achieve the highest possible success rate and to generate highly innovative leads. We offer collections containing 4, 12, 24, 40, or 80 rare spider venoms as well as a collection containing 24 rare tarantula venoms.

Snake Venom Collection

This collection contains 134 snake venoms (102 common and 32 rare* snake venoms).

Custom Venom Libraries

We offer the option for custom venom collections. We can help you select a specific venom from a particular animal, or a venom with specific physiological effects. We can also aliquot venoms to meet your particular HTS specification.

**Rare venoms may originate from a single, unique animal specimen, or from a species that produce tiny amounts of venom, or from species requiring extensive preparation efforts.*

SCREENING AND HITS TO LEADS

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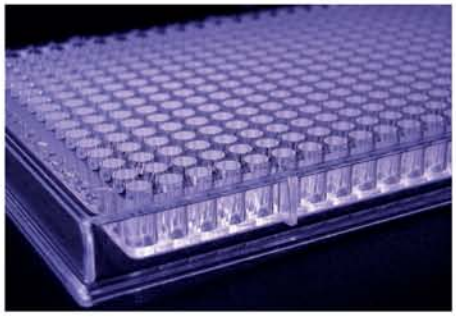
Target Validation

MELUSINE



Compound libraries of high quality venoms from a wide range of animal sources, pre-fractionated in multi-well plate format for direct use in high throughput screening.

BENEFIT:
- *Hit rates directly at nM or pM concentrations*
- *Unprecendented hit-to-lead rates*

High Throughput Screening

Identifies which wells show desired biological activity against the given target

Sub-fractionation and Final Purification of Hits

To identify specific hit molecule from mixture

BENEFIT:
- *Additional fractionated venoms in stock for hit confirmation*

Hit Confirmation

Resupply from parent well

Structure/Sequence Elucidation

Via MS/MS, Edman sequencing, and peptide mapping

Synthesis of Lead

Performed by Bachem via total chemical synthesis

Validation of Synthetic Hits

Using chromatographic co-elution and comparative MS profiles

Targeted Drug Discovery Case Study

CONCO, the cone snail genome project for health, is an innovative post-genomic project dedicated to the discovery and development of novel biopharmaceuticals generated by the broad biodiversity of cone snails. CONCO gathers 20 partners from 13 countries, including the prestigious J. Craig Venter Institute in Rockville, Maryland USA, where the human genome was elucidated.

In the CONCO project, the genome, venom gland transcriptome, and venom proteome of *Conus consors* are exhaustively studied. This is the first integrated venomics project with the aim to better understand how the venomous system works. With modern analytical techniques and methods, the chemical structure of the conopeptides are investigated and their biological activities are tested on a variety of physiological targets with potential therapeutic value. These include nervous membranes, isolated receptors, and ion channels. The active peptides are chemically synthesized, modified, and further evaluated as potential drug candidates.

By combining electrophysiological information with the Atheris Laboratories venomics platform, CONCO has identified XEP-018 as its first lead candidate. XEP-018 is a peptide from cone snail that has unprecedented myorelaxant properties. XEP-018 is undergoing pre-clinical studies with plans to develop it as an anti-pain/anesthetic myorelaxant drug.

This work was supported by the European Commission. For more information see www.conco.eu

Atheris laboratories
www.atheris.com

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