

# AGILE MODULAR SCALABLE

Aenitis leverages gentle cell bioprocess technology that **continuously adapts to your operations.**

## A unique & gentle patented technology

- ⊕ Up to 98% cell recovery
- ⊕ No loss of cell viability
- ⊕ Preserves cell phenotype

## Ideal for

- ⊕ Cell concentration
- ⊕ Cell washing
- ⊕ Cell Sorting

### Performance & process control

Flow rate: 1 to 40 mL/min/channel  
Sterile & continuous flow process  
**No mechanical stress**



### Industrial readiness

Easy scale-up from 20mL to any volume  
3D printed custom consumables  
GMP ready in 4 months  
**Unique flexibility**



Want to  
know more ?



  
aenitis

Acoustic Advanced Bioprocessing

More...

# You want to learn more about Acoustic Cell handling ?

## Read our White Paper !

### Acoustic Cell Handling White Paper

A gentle, closed and scalable unit operation for cell therapy manufacturing

#### Context: Bioproduction and Gene Therapy

The cell therapy industry is undergoing rapid growth, driven by higher expectations for product quality and safety. Traditional equipment used in research labs, are often not designed for large-scale manufacturing. This leads to more manual processes, higher risk of contamination and/or higher costs.

There is a need for a gentle, closed and scalable unit operation for cell therapy manufacturing. This is a key challenge for the industry. The high G-forces required to collect cells, followed by the necessary manipulation and separation of the target cells, introduce shear stress that can reduce cell viability and functionality. While centrifugation is effective for bulk operations, it is highly aggressive compared to modern alternatives.

Acoustic Cell Handling White Paper



#### Acoustic waves (SAW)

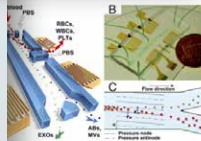


Figure 1: Cell recovery from whole blood with 2 SAW sorting modules. Source: <https://doi.org/10.1039/C9XB00001A>

Devices using SAWs are made for very small volumes, and the use of high acoustic frequencies allows the manipulation of very small objects. They require special acoustic sources called Interdigitated Transducers (IDT). Connected to a glass or silicon microchannel, these devices allow for the identification of the cells through a microscope. A notable result was the sorting of monocytes from whole blood by Tony Hung's team, that one on 30-150 nm scale. With fluorescence, it was possible to observe the deviation of monocytes. Other objects in the biological solution and the flow have the acoustic power to enhance high yield and purity. This particular device contains two streams of microfluidics: the first (IDT) silver wires cells bigger than 2um like platelets (PLTs), white blood cells (WBCs) and red blood cells (RBCs) in a 500 µm. The second 100 MHz stream can affect smaller objects and aims at separating monocytes from other sub-micrometer objects like apoptotic bodies (ABs) and microvesicles (MVs). This device potentially opens ways that need to perform several steps of centrifugation, with treated parameters. It also increases the acoustic isolation yield to 50% (against 5-6% with differential centrifugation methods) and the purity is 98.6%.

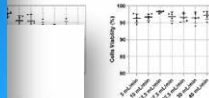
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#### Experimental protocol

A preconcentration protocol starts with these 4 steps:

1. The size of the subobject to concentrate, whether the contrast factor is positive (cells) or negative (cells) in media, the volume to process in a given time, and the final concentration and yield.  
2. The viscosity of the sample. For acoustic devices can vary a lot from those in a case of blood cells. This will affect the power required to concentrate the cells. A 10% difference is not a major concern.  
3. The target flow rate of different powers, until finding the best yield (lowest cell loss) achievable throughout the process.  
4. The power for cell production.

#### Results



For oligonucleotides, the results are similar.

#### Flow rates

Flow rates have been performed. From 100 µl/min to 1000 µl/min, the flow rate is fully scalable with 100-500 cells/ml, but a 1000 µl/min flow rate is not possible for similar sizes were tested. The maximum flow rate for 100 µl/min is 1000 µl/min. The required power to reach from 100 µl/min to 1000 µl/min is 100 mW. The required power is higher than 25 W.

#### Handling White Paper

SCAN ME !



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