APPLICATION NOTE

ACOU**WASH**

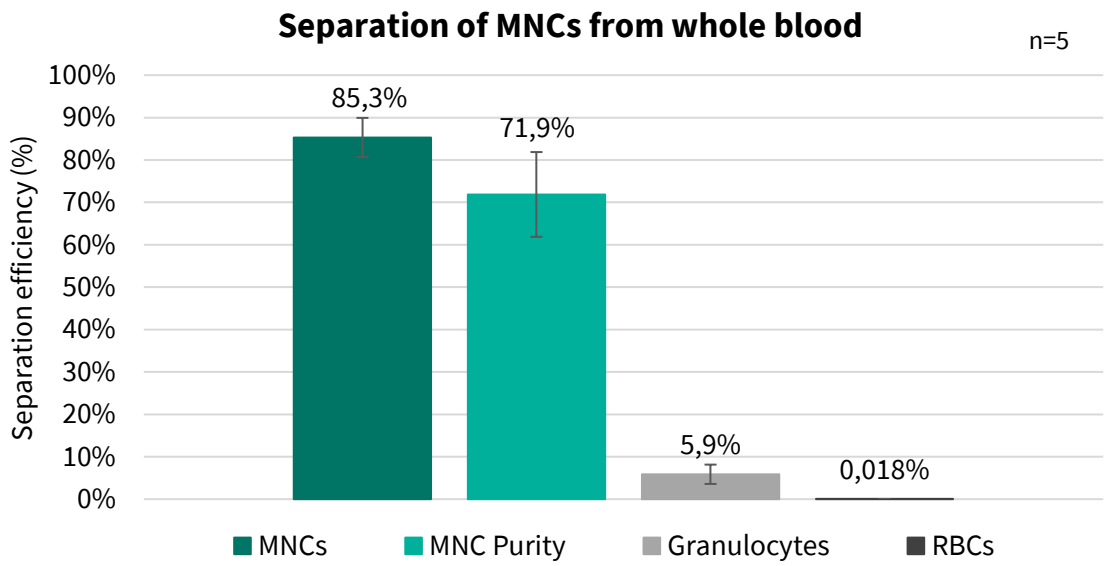
MONONUCLEAR CELL ENRICHMENT

Label-free Acoustic Separation using AcouWash

Separation of mononuclear cells (MNCs) from peripheral whole blood is a key process step prior to many different research, diagnostic and therapeutic procedures. The standard density centrifugation method, using Ficoll-Paque or similar density media, is time and labour consuming, requires large sample volumes and is ill-suited for integration. AcouWash is an automated acoustofluidic platform performing MNC separation straight from undiluted whole blood samples.

High-quality separation of mononuclear cells in continuous flow

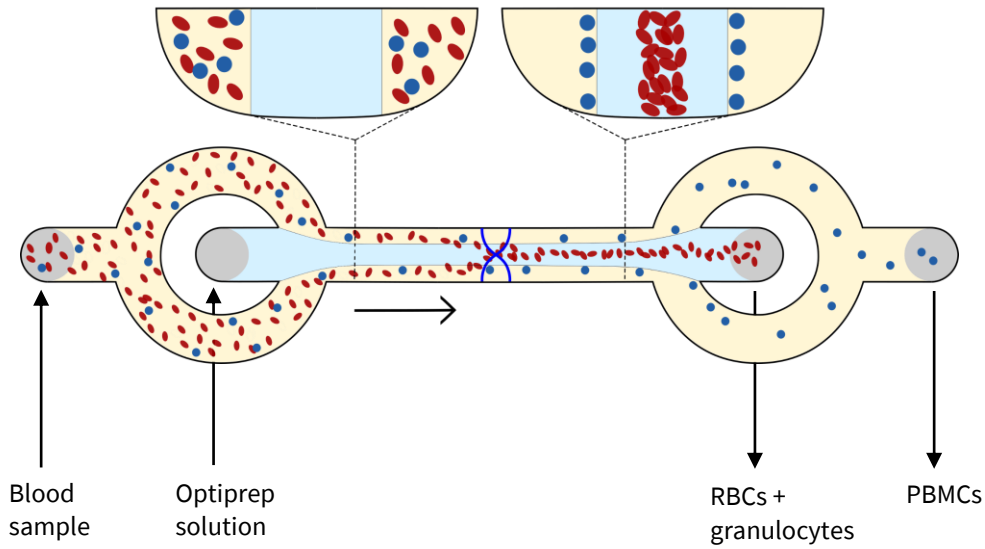
- Minimising manual steps using AcouWash
- Gentle separation method: 98% viability of output cells
- Undiluted whole blood as input sample
- Can process small sample volumes (<500 µl)
- Up to 84% output sample purity



AcouWash Separation Performance

	AcouWash high purity mode	AcouWash high efficiency mode	Ficoll-Paque centrifugation
Separation efficiency [%]*	72 ± 10	85 ± 5	60 ± 20**
Purity [%]	84 ± 7	72 ± 10	95 ± 5
Cell viability [%]	98 ± 1	98 ± 1	>80
Remaining granulocytes [%]	1 ± 1	6 ± 2	5
Process	Load sample in AcouWash	Load sample in AcouWash	3x centrifugation + several manual pipetting steps
Processing of small volumes (< 0.5 ml)	Yes	Yes	No

*Separation efficiency is defined as the ratio between the number of MNCs in the side outlet and both outlets combined
** Recovery value is defined as the ratio of cells after separation as compared to the input sample. Data is from the Ficoll-Paque data sheet.



AcouWash: 500 µl human whole blood was processed in the AcouWash at 20 µl/min throughput. The centre inlet medium consisted of 55% Optiprep in PBS. Output samples were stained for CD45, CD61, CD235a, CD66b and PI and analysed using BD FACS Canto II.

Ficoll-Paque centrifugation: Separation values for comparison are from the Ficoll-Paque data sheet, where whole blood is diluted before being layered on top of Ficoll-Paque and centrifuged.