

Next Level Liver Support

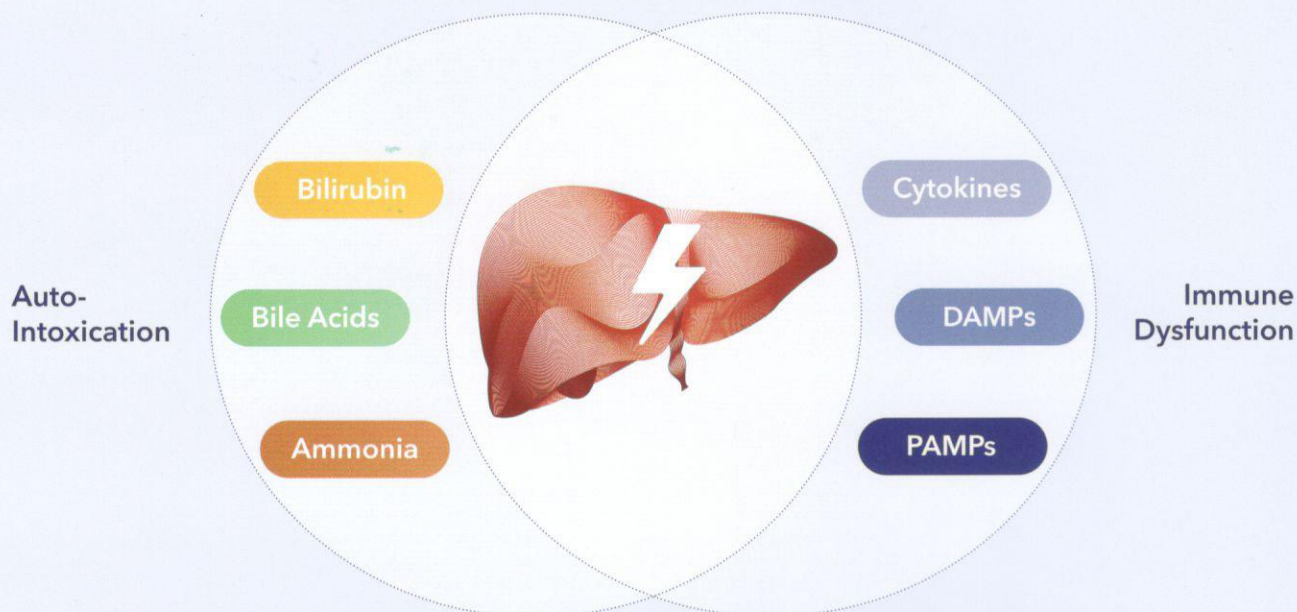
Liver toxin removal PLUS immunomodulation



- Removal of bilirubin and cytokines⁽¹⁻⁶⁾
- Potential to improve hepatic encephalopathy^(2,4)
- Stabilization of hemodynamics^(5,6)

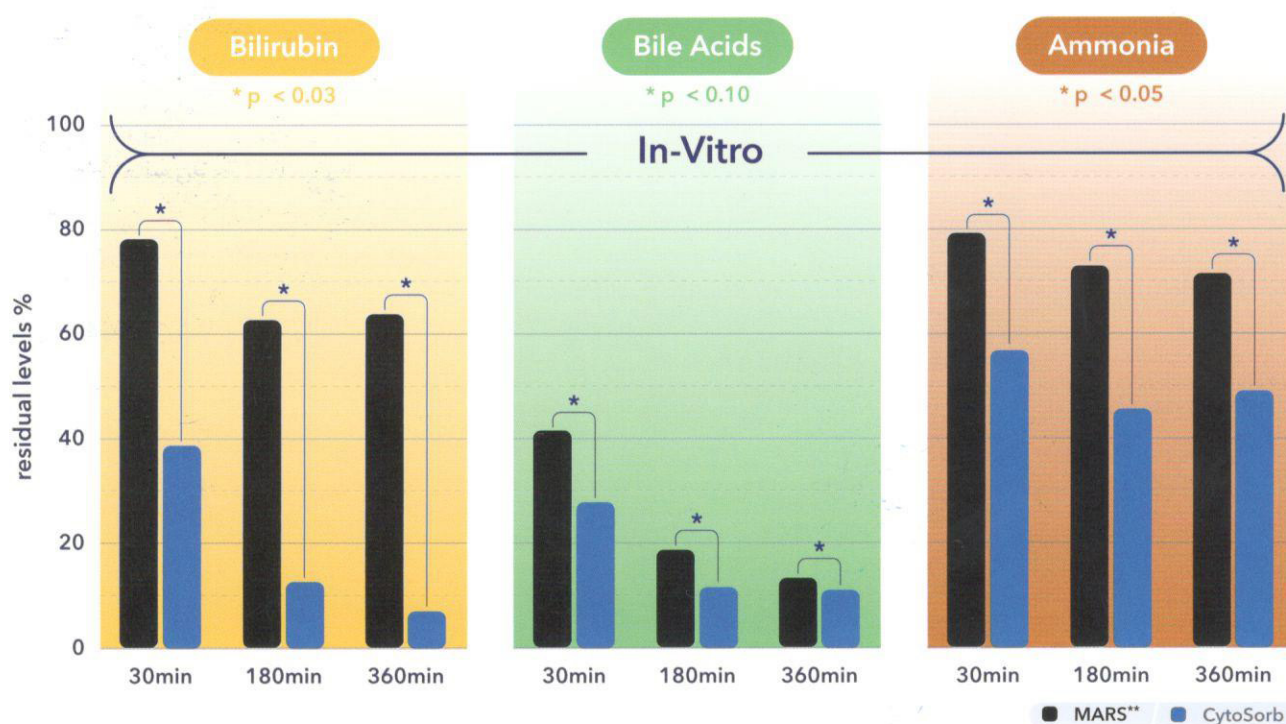
➤ Liver failure is a complex clinical syndrome⁽⁷⁾

- Impaired hepatic detoxification capacity leads to accumulation of various liver toxins such as bilirubin, bile acids and ammonia.
- Systemic hyperinflammation can result in immune dysfunction.



➤ CytoSorb removes bilirubin.⁽¹⁶⁾ Reduction of Bile Acids and Ammonia was observed.^(2,8)

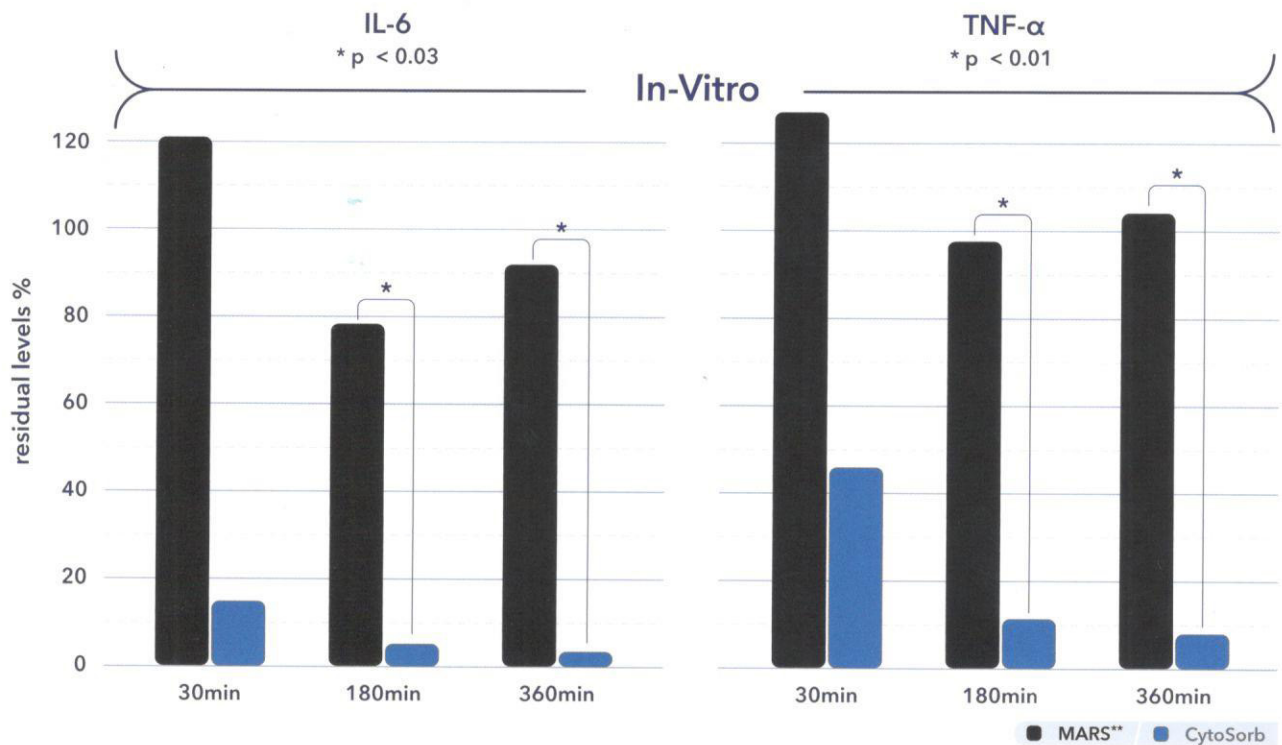
An in-vitro investigation[§] demonstrated that CytoSorb was superior to MARS** for reducing bilirubin and bile acids as well as ammonia during the 6 hours of treatment.⁽⁸⁾



** MARS albumin dialysis modified with a novel charcoal adsorbent

➤ CytoSorb also removes cytokines ^(4,5,6,8)

An in-vitro investigation [§] showed that CytoSorb hemoperfusion led to the fast reduction of IL-6 and TNF- α levels compared to MARS ^{**} after 30, 180 and 360 minutes of treatment. ⁽⁸⁾



CytoSorb Therapy can be seen as the next level liver support as it is addressing liver toxin removal as well as concomitant hyperinflammation.

➤ When to consider CytoSorb Therapy?

CytoSorb Therapy may be considered in clinical conditions of liver failure with one or more of the following criteria being present:

- Bilirubin > 10mg/dl ^(9,10)
- Hepatic encephalopathy (grade ≥ 2 or with risk for deterioration) ^(2,3,4)
- Vasoplegic states with high level of vasopressor support ⁽⁹⁾

Post-operative deterioration in hepatic function has been observed to varying degrees post liver resection ⁽¹¹⁾ and cardiac surgery. ^(12,13)

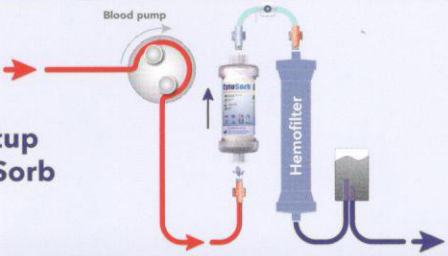
CytoSorb Therapy may be considered in patients with:

- Post-Hepatectomy Liver Failure (PHLF)
- Post-Cardiothoracic Surgery Hyperbilirubinemia

► CytoSorb Therapy


- Easy and safe to use ^(9,14,15)
- Ready to use in five minutes ⁽¹⁶⁾
- Effective broad spectrum removal ^(5,17)
- Whole blood adsorber approved for up to 24h of use ⁽¹⁶⁾

EXPLORE



**Find out more
about different setup
options with CytoSorb**



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systems**

Jan Stange






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**New liver support
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§ An in vitro two-compartment model for the comparison of liver support techniques was used to compare MARS albumin dialysis modified with novel charcoal adsorbents to CytoSorb hemoperfusion with added hemodialysis for effects on marker molecule removal.

Compartment 1 was made up from 1 L of human plasma spiked with liver failure toxins including water-soluble (ammonia, Cr, and urea) and albumin-bound toxins (conjugated [direct] bilirubin, unconjugated [indirect] bilirubin, bromosulphthalein, primary bile acid, and chenodesoxycholic acid). Dynamic processes of toxin accumulation and redistribution from the extravascular space are accounted for in this model using continuous infusion of compartment 2 solution made up from aforementioned toxins. The used 2-compartment model was modified by the addition of 150 µg/L recombinant human TNF-α and 150 µg/L recombinant human IL-6 to compartment 1.

Measured concentrations for water-soluble toxins and albumin-bound toxins are referenced against compartment 1 concentrations as a 100% reference. This allowed for the comparison of residual levels.

Visit <https://literature.cytosorb.com> for an overview of all references

CytoSorbents Europe GmbH

Müggelseedamm 131
12587 Berlin | Germany
T +49 30 65 49 91 45
F +49 30 65 49 91 46
support@cytosorbents.com

follow us on     | www.cytosorb.com

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