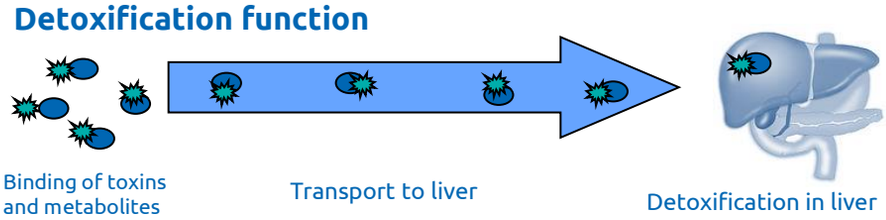
Liver diseases

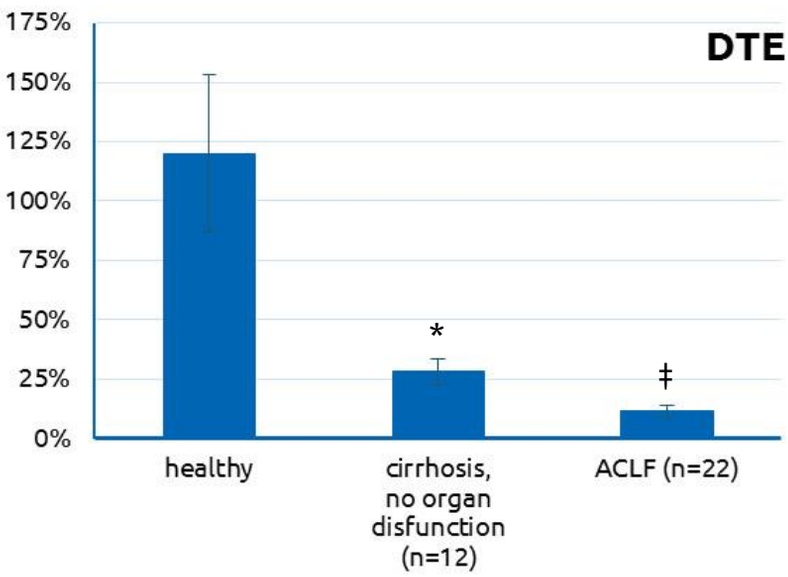
Detoxification function



Study results

In a study investigating patients with different liver diseases, the albumin-functionality-test showed that the detoxification efficiency of these patients is distinctly reduced, in comparison to a healthy control group [1, 2].

In patients with acute-on-chronic liver failure (ACLF), this parameter showed a further reduction in comparison to patients with liver cirrhosis without organ dysfunction.



* p<0.001 compared with healthy volunteers
‡ p<0,01 compared with cirrhosis

Studies on liver diseases are currently being carried within the context of clinical studies [study #1 University of Bologna, Sant'Orsola Malpighi University Hospital Ethics Committee code 075/2012/U/Tess; study #2 ANSWER-Study (EudraCT, number 2008–000625–19, and ClinicalTrials.gov, number NCT0128879) ; study #3 UCL Medical School London, Projekt ALIVER: DIALIVE -ACLF NCT03065699].

Transport parameters

The albumin-functionality-test based on EPR technology provides different parameters for comprehensive evaluation of the albumin functionality.

The **detoxification efficiency** (DTE in %) is a functional parameter for evaluation of the quality of albumin as transport vehicle in competitive situations.

It describes how well toxins can be eliminated and harmful substances can be delivered to the target tissue, also if there exists an increased accumulation of this substances in the organism.

Additionally the **binding efficiency** (BE in %) describes capacity of the fatty acid binding sites and the **real transport quality** (RTQ in %), the transport function of the investigated albumin solution.

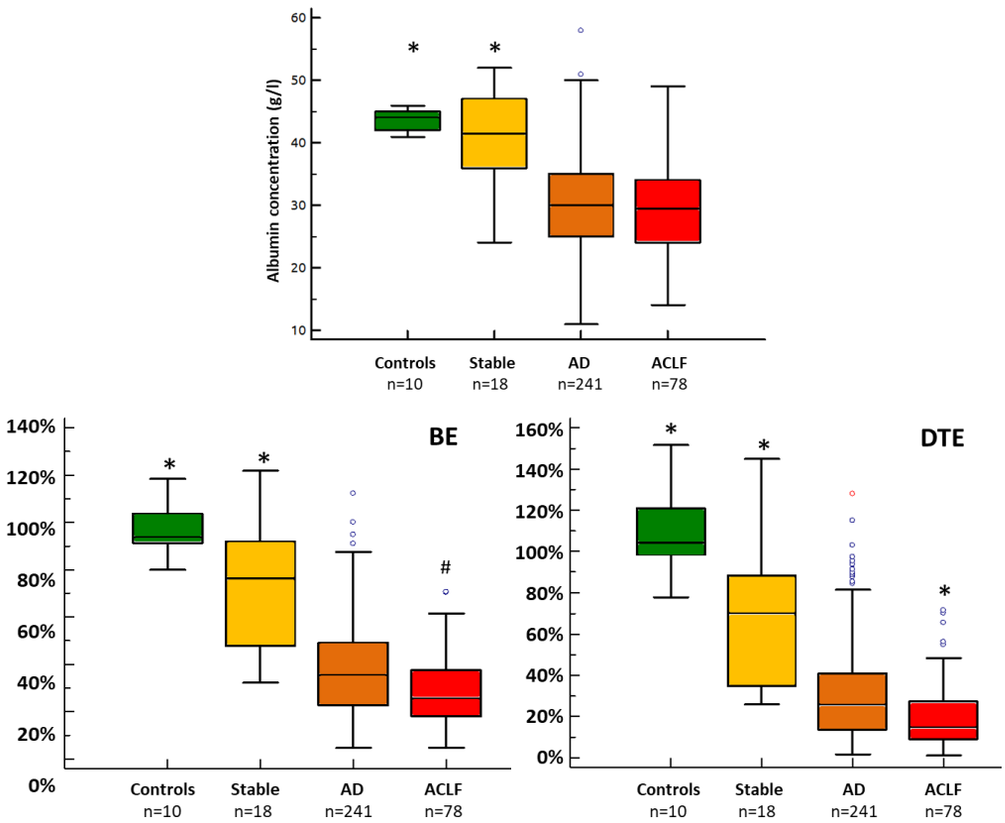
Recent study results - liver

Publication Hepatology 2021

The latest data from the albumin function test in patients with liver disease were published in Hepatology in 2021 together with clinicians and scientists from the University of Bologna, Italy („Determination of Effective Albumin in Patients With Decompensated Cirrhosis: Clinical and Prognostic Implications.“)

In this study, non-hospitalized patients with stable cirrhosis (stable) were compared with hospitalized patients with acut decompensated cirrhosis (AD) or ACLF with regard to their albumin (concentration and quality).

The albumin-functionality-test was able to show in patients with acut decompensated cirrhosis (AD) or ACLF that the binding and detoxification efficiency is significantly reduced compared to the control group but also to patients with stable cirrhosis (stable). It is also possible to differentiate between AD and ACLF. This distinction is not possible with the albumin concentration [2].



Mann-Whitney-test vs. AD (* p<0.0001; # p=0.0001)

Principal component analysis (PCA)

A PCA was applied to five parameters of the albumin function test. The first main component (PC1) already covers 89% of the total variance in patients with AD and 86% in ACLF and was therefore selected to represent the remaining albumin function.

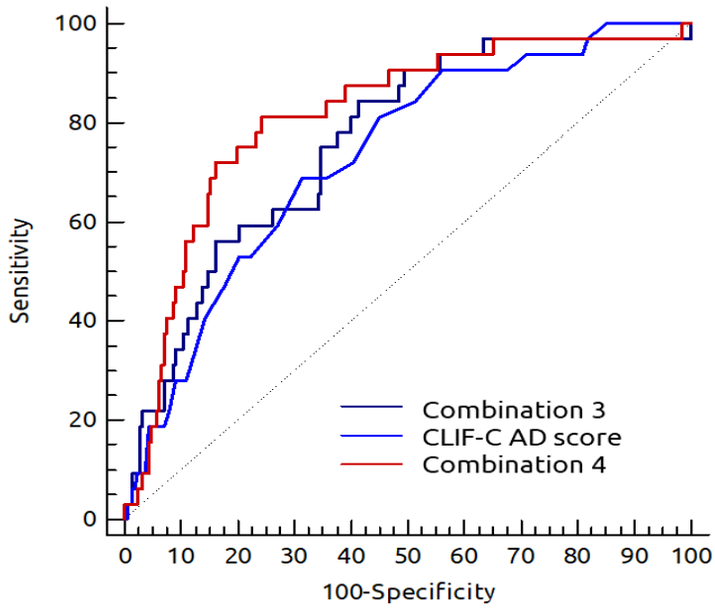
In a multiple linear regression both tAlb (total albumin concentration) and eAlb (effective albumin concentration) and the MELD score were shown as independent predictive values for the remaining albumin function, described by PC1 [2].

	Standardized Coefficient	P*Value*
AD (n=241)		
tAlb (g/dl)	0,386	<0,001
eAlb (g/dl)	0,259	0,001
MELD score	-0,165	0,002
ACLF (n=78)		
tAlb (g/dl)	-	-
eAlb (g/dl)	0,350	0,001
MELD score	-0,311	0,003

Recent study results - liver

Prognosis of development of ACLF

The CLIF-C AD score describes the risk of patient with AD to develop an ACLF.

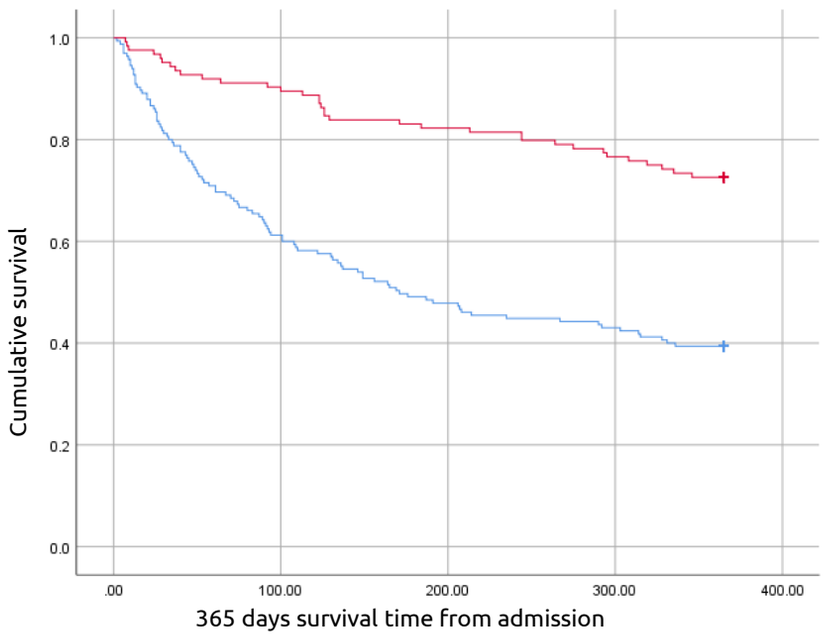


Further analyzes of these study data showed that a combination of parameters of the albumin – functionality-test had the same diagnostic performance (AUC 0.76 [0.70-0.81]) as the CLIF-C AD score (0.73 [0.67-0.79]).

A combination of both could significantly improve the diagnostic performance of the CLIF-C AD score alone (0.81 [0.76-0.86]). (Manuscript in progress)

Prognosis of 1-year-survival by use of parameter of albumin-functionality-test

Patients with a parameter (C5B) greater than 0.57% (red line) showed a significantly better survival than patients with a value less than 0.57% (blue line).



A Kaplan-Meier survival analysis of hospitalized patients (AD and ACLF) revealed a significant difference in terms of survival rate based on attachment efficiency (P = 0.001).

One parameter of the albumin function test (C5B) was able to improve this significantly (P <0.001). (Manuscript in progress)

References

[1] Jalan R, Schnurr K, Mookerjee RP et al. (2009) Hepatology 50: 555-564

[2] Baldassarre M, Naldi M, Zaccherini G, et al. (2021) Hepatology doi: 10.1002/hep.31798