

Category :**Hematology: Other**

A71 - Sorption of sepsis-associated metabolites on the mesoporous carbon sorbent modified with 3-phenylpropanoic acid

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Introduction:

We studied the mesoporous carbon sorbent VNIITU-2, modified with 3-phenylpropanoic acid (PhPA), because this metabolite of normal gut microbiota has a number of positive properties. Previously, we showed that PhPA is always present in blood of healthy humans, but is absent in patients with sepsis. The aim of the work is to evaluate the ability of the modified sorbent to perform targeted sorption of metabolites associated with sepsis and desorption of the modifier.

Methods:

In an experiment *in vitro*, created model solutions in blood plasma with sepsis-associated metabolites such as 3-phenyllactic (PhLA), 2-(4-hydroxyphenyl)acetic (p-HPhAA), 3- (4-hydroxyphenyl)lactic (p-HPhLA) acids close to the known concentration of these metabolites in the blood serum of patients with A) renal failure, B) sepsis, C) septic shock (**Table 1**). The sorbent without a modifier and three types of sorbents with different content of the modifier PhPA were studied. A 1 ml aliquot of model solutions was added to each 1.5 ml Eppendorf tube with the sorbent for the sorption experiments, n=3 for min, middle and max concentration. The weight of the sorbent was 0.053±0.001 g. The mixture was shaken for 30 min, the supernatant was taken for analysis by liquid-liquid extraction and gas chromatography-mass spectrometry.

Results:

The degrees of the sorption of all sepsis-associated metabolites for the minimum and middle concentrations of the model solutions were more than 90%. Only at the maximum concentration of PhLA, p-HPhAA, p-HPhLA in solution and the maximum concentration of the PhPA modifier on the sorbent, sorption decreased slightly to 50-80 %. In all modified sorbents, there was an easy and fast desorption of PhPA from the surface of the sorbent into the solution.

Conclusion:

The studied modified sorbent demonstrated *in vitro* ability to perform the function of purifying the blood from toxic sepsis-associated compounds, and simultaneously it can serve as a carrier for the delivery of missing metabolites to the body.

Table:

Model solutions	Correspond to the pathological conditions (conc.)	PhLA	p-HPhAA	p-HPhLA
A	renal failure (min)	7	8	7
B	sepsis (middle)	22	24	20
C	septic shock (max)	72	79	66

Concentrations of sepsis associated metabolites in model solutions, μmol/L