

# IMMUNOMODULATORY EFFECTS OF DOUBLE PLASMA MOLECULAR ABSORPTION SYSTEM IN PATIENT WITH DECOMPENSATED LIVER FAILURE

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## Introduction

Recently, Double plasma molecular absorption system (DPMAS) was proved to be equally effective with total plasmapheresis (TPE) in bilirubin reduction and mortality rate. However, the immunomodulatory effects of DPMAS have not been explored. We reported improvement of immunomodulatory effects in a case of decompensated liver disease who received DPMAS therapy.

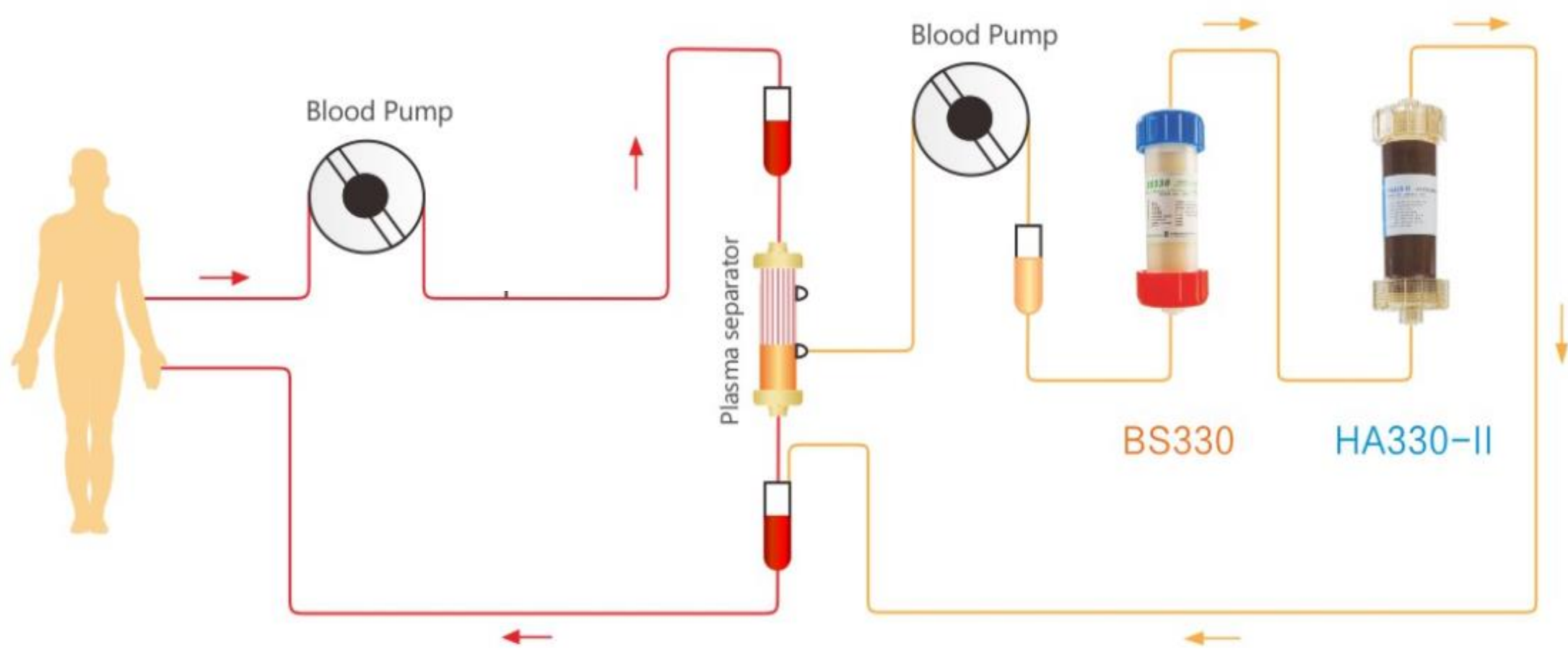


Figure 1 Double plasma molecular absorption system circuit

## Case Description

A case of 65-year-old Thai male who presented with progressive jaundice for 3 days. He had underlying disease of HBV cirrhosis, Child–Turcotte–Pugh score (CTP) class B.

After admission, he developed hepatic encephalopathy (HE) grade 3 and hepatorenal syndrome requiring renal replacement therapy. His conditions failed to improve with standard treatments consisted of laxative, albumin infusion and antiviral medication.

DPMAS therapy was done one session per day for three consecutive days. The circuit consisted of bilirubin adsorbent hemoperfusion cartridge (BS330; Jafron, Zhuhai City, China) and the resin adsorbent hemoperfusion cartridge (HA330-II; Jafron, Zhuhai City, China). We used blood flow rate of 150 ml/min and plasma flow rate of 30 ml/min without anticoagulant (Figure 1).

After third session of DPMAS, HE was improved from grade 3 to grade 2. Serum total bilirubin and IL-6 levels were reduced from 34.9 mg/dL to 20.1 mg/dL and 425 to 243.7 pg/mL, respectively (Table 1). We found improvement of monocyte human leukocyte antigen (mHLA-DR) expression from 28.7 percent (prior to first session of therapy) to 50.3 percent (after third session of therapy). CD11b expression was decrease from 16.7 percent to 11.9 percent (Table 2).

Laboratory values	Before 1 <sup>st</sup> session	After 1 <sup>st</sup> session	Before 2 <sup>nd</sup> session	After 2 <sup>nd</sup> session	Before 3 <sup>rd</sup> session	After 3 <sup>rd</sup> session	Day 7
Total bilirubin, mg/dL	34.9	27.9	30.3	21.0	28.5	20.1	41.0
Direct bilirubin, mg/dL	22.4	19	19.9	12.7	18.3	12.5	27.4
SGOT, U/L	811	751	449	444	342	342	222
SGPT, U/L	1150	1050	621	618	483	483	106
ALP, U/L	161	162	124	138	149	129	148
Ammonia, mcg/dL	148	148	153	130	128	125	115
PT	29.3	37.2	34.1	32.8	38.6	64	33.3
INR	2.62	3.35	3.06	2.94	3.5	5.9	2.99
APTT	29.3	61.5	65.5	59.7	65.9	140.1	69.8
Ferritin, ng/mL	11027	11373	7553	7304	5541	5556	-
Interleukin-6, pg/mL	425	523	305	358.8	242.7	243.7	175
hs-CRP	116	92.2	84.6	60.1	78.3	56.3	-

Table 1. Serum laboratory values during DPMAS sessions and day 7 after the first session.

Abbreviations: ALP, Alkaline phosphatase; APTT, Activated partial Thromboplastin Time; hs-CRP, High Sensitivity C-Reactive Protein; INR, international normalized ratio; PT, Partial thromboplastin time; SGOT, Serum Glutamic-Oxaloacetic Transaminase; SGPT, Serum glutamate-pyruvate transaminase

	Before 1 <sup>st</sup> session	Before 2 <sup>nd</sup> session	Before 3 <sup>rd</sup> session	After 3 <sup>rd</sup> session
CD11b (%)	16.7	18.0	13.4	12.0
CD11b (MFI)	10093.1	1572	7270.2	3361.3
mHLA-DR expression (%)	28.7	22.2	41.4	50.3
mHLA-DR expression (MFI)	3233.9	1507.8	1549.3	3073.9

Table 2. Immunomodulatory effect of DPMAS during and after DPMAS sessions

## Discussion

We demonstrated that DPMAS was effectively reduce HE grading, total bilirubin, and IL-6 level. We are the first to show an improvement of mHLA-DR and CD11b expressions after DPMAS therapy of decompensated liver disease patient. From this finding, we can imply that DPMAS had an immunomodulatory effect in this patient. However, a randomized controlled trial is required to prove this concept.

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