

1 **ABSTRACT**

2 The aim of this study was to obtain comprehensive data regarding the hemocompatibility of
3 diamond-like carbon (DLC)-coated expanded polytetrafluoroethylene (ePTFE). DLC
4 increased the hydrophilicity and smoothed the surface and fibrillar structure, respectively,
5 of the ePTFE. DLC-coated ePTFE had more albumin and fibrinogen adsorption and less
6 platelet adhesion than uncoated ePTFE. There were scarce red cell attachments in *in vitro*
7 human and *in vivo* animal (rat and swine) whole blood contact tests in both DLC-coated and
8 uncoated ePTFE. DLC-coated ePTFE had a similar but marginally thicker band movement
9 than uncoated-ePTFE with SDS-PAGE after human whole blood contact test. In addition,
10 survival studies of aortic graft replacement in rats (1.5 mm graft) and arteriovenous shunt in
11 goats (4 mm graft) were performed to compare the patency and clot formation between DLC-
12 coated and uncoated ePTFE grafts. Comparable patency was observed in both animal models.
13 However, clots were observed in the luminal surface of the patent 1.5mm DLC-coated ePTFE
14 grafts, but not in that of uncoated ePTFE grafts. In conclusions, hemocompatibility of DLC-
15 coated ePTFE was high and comparable to that of uncoated ePTFE. However, it failed to
16 improve the hemocompatibility of 1.5 mm ePTFE graft probably because increased
17 fibrinogen adsorption canceled the other beneficial effects of DLC.

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