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(54) Title: INTEGRATED MULTI-ELECTRODE ARRAY AND TRANS-ENDOTHELIAL ELECTRICAL RESISTANCE IN ORGAN-ON-A-CHIP MICROSYSTEMS

(57) Abstract: An organ-on-chip device for monitoring a biological function and including a membrane layer located at an interface region between a top microchannel and the a microchannel. The membrane includes a first type of cells forming a barrier between the top microchannel and the bottom microchannel. The device further includes a top layer having a first plurality of transendothelial electrical resistance (TEER) measurement electrodes for enabling direct monitoring of cell function and electrical activity of the first type of cells on the membrane. The device also has a multi-electrode array (MEA) layer with a second plurality of TEER measurement electrodes for enabling direct monitoring of cell function and electrical activity of a second type of cells on the MEA layer.