

Supplementary Information (SI):

Table SI1: Magainin 2-induced dye leakage rates and pore sizes in GUVs (50% DOPG/50% DOPC, $5\pm 1\ \mu\text{m}$ radius, 25°C) at final steady state (*Tamba et al., 2010*).

Fluorescent Probe	R_{SE} (nm)	$D \times 10^{-10}$ (m^2/s)	Small		Medium		Large	
			Pore	k_{leak}	Pore	k_{leak}	Pore	k_{leak}
Calcein	0.74	3.31	—	—	24 ± 2	0.0560 ± 0.0021	—	—
TRD-3k	1.40	1.75	18 ± 1	0.0045 ± 0.0004	26 ± 1	0.0100 ± 0.0010	46 ± 2	0.0200 ± 0.0060
TRD-10k	2.70	0.91	20 ± 1	0.0022 ± 0.0005	25 ± 1	0.0033 ± 0.0004	40 ± 3	0.0076 ± 0.0009
AF-SBTI	2.80	0.88	16 ± 3	—	26 ± 2	—	39 ± 2	0.0026 ± 0.0004

Table SI2: The calculated values of k_{mt} for the different fluorescent probes

Suspension Area l (μm)	d (μm)	r (nm)	Probes	R_{SE} (nm)	D_i (m^2/s) $\times 10^{-10}$	Pore		Experiment	Simulation
						N	Size (nm)	$k_{leak}(\text{s}^{-1})$	$k_{mt}(\text{s}^{-1})$
15	10	20	Calcein	0.74	3.31	07 (2.8)	15 ± 1	-	0.02980 ± 0.0012
			TRD-3k	1.40	1.75		18 ± 1	0.0045 ± 0.0004	0.00537 ± 0.0005
			TRD-10k	2.70	0.91		20 ± 1	0.0022 ± 0.0005	0.00244 ± 0.0006
			AF-SBTI	2.80	0.88		16 ± 3	-	0.00195 ± 0.0005
		25	Calcein	0.74	3.31	09 (2.8)	24 ± 2	0.0560 ± 0.0021	0.04020 ± 0.0020
			TRD-3k	1.40	1.75		26 ± 1	0.0100 ± 0.0010	0.01086 ± 0.0013
			TRD-10k	2.70	0.91		25 ± 1	0.0033 ± 0.0004	0.00362 ± 0.0005
			AF-SBTI	2.80	0.88		26 ± 2	-	0.00221 ± 0.0006
		43	Calcein	0.74	3.31	12 (3.6)	36 ± 3	-	0.06150 ± 0.0030
			TRD-3k	1.40	1.75		46 ± 2	0.0200 ± 0.0060	0.01886 ± 0.0037
			TRD-10k	2.70	0.91		40 ± 3	0.0076 ± 0.0009	0.00783 ± 0.0010
			AF-SBTI	2.80	0.88		39 ± 2	0.0026 ± 0.0004	0.00276 ± 0.0007

Table SI3: The calculated values of k_{mt} for the different sizes of multipores

Suspension Area l (μm)	d (μm)	Probes	R_{SE} (nm)	D_i (m^2/s) $\times 10^{-10}$	r (nm)	Pore		Experiment	Simulation
						N	Size (nm)	$k_{leak}(\text{s}^{-1})$	$k_{mt}(\text{s}^{-1})$
15	10	Calcein	0.74	3.31	20	07 (2.8)	15	-	0.02980 ± 0.0012
					25	09 (2.8)	24	0.0560 ± 0.0021	0.04020 ± 0.0020
					43	12 (3.6)	36	-	0.06150 ± 0.0030
		TRD-3k	1.4	1.75	20	07 (2.8)	18	0.0045 ± 0.0004	0.00537 ± 0.0005
					25	09 (2.8)	26	0.0100 ± 0.0010	0.01086 ± 0.0013
					43	12 (3.6)	46	0.0200 ± 0.0060	0.01886 ± 0.0037
		TRD-10k	2.7	0.91	20	07 (2.8)	20	0.0022 ± 0.0005	0.00244 ± 0.0006
					25	09 (2.8)	25	0.0033 ± 0.0004	0.00362 ± 0.0005
					43	12 (3.6)	40	0.0076 ± 0.0009	0.00783 ± 0.0010
		AF-SBTI	2.80	0.88	20	07 (2.8)	16	-	0.00195 ± 0.0005
					25	09 (2.8)	26	-	0.00221 ± 0.0006
					43	12 (3.6)	39	0.0026 ± 0.0004	0.00276 ± 0.0007