



## Supplementary Materials for

### ***Rhomboid distorts lipids to break the viscosity-imposed speed limit of membrane diffusion***

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Tables S1, S2, and S3

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**Table S1. Mean diffusion coefficients of membrane proteins measured by single-particle tracking**

<b>Protein</b>	<b>Mean diffusion coefficient (<math>\mu\text{m}^2/\text{s}</math>)</b>	<b>Source</b>
Kv1.3	0.0002	(22)
AChR	0.001	(47)
CFTR	0.005	(48)
BK channel	0.0067	(24)
MHC class I	0.0179	(49)
Kv2.1	0.02	(21)
EGFR	0.049	(50)
band 3	0.049	(51)
GABA	0.0524	(52)
$\beta$ 2-AR	0.0531	(52)
HER2	0.055	(23)
$\beta$ 1-AR	0.0648	(52)
TGF $\beta$ -R1	0.065	(19)
GPC	0.076	(51)
AQP1	0.09	(53)
integrin $\alpha$ PS2C $\beta$ PS	0.1	(54)
CD4	0.11	(55)
$\alpha$ 3-GlyR	0.13	(56)
KCa3.1	0.139	(57)
TNF-R1	0.14	(58)
CaV1.2	0.15	(59)
Smo	0.26	(60)
TrkA	0.47	(20)
rhodopsin*	0.5	(25, 26)
Vrho	0.69	this study, 64 Hz frame rate
iRhom2	0.75	this study, 64 Hz frame rate
iRhom1	0.81	this study, 64 Hz frame rate
RHBDL2	0.81	this study, 64 Hz frame rate
DmRho4	0.86	this study, 25 Hz frame rate
TvR1	0.97	this study, 64 Hz frame rate
EhR1	0.97	this study, 64 Hz frame rate

\*these classical studies did not use single-particle tracking, but are included because of their foundational nature

**Table S2: Spin probe accessibility parameters**

Labelling site	$\Delta\text{N-GlpG}$	$\Delta\text{N-GlpG}$	GlpG	GlpG
	$\Pi(\text{O}_2)^*$	$\Pi(\text{NiEDDA})^\dagger$	$\Pi(\text{O}_2)^*$	$\Pi(\text{NiEDDA})^\dagger$
I102R1	$2.10 \pm 0.06$	$0.37 \pm 0.07$	$3.31 \pm 0.18$	$0.39 \pm 0.15$
I109R1	$0.45 \pm 0.02$	$0.44 \pm 0.03$	$0.58 \pm 0.01$	$0.41 \pm 0.05$
F135R1	$1.00 \pm 0.10$	$0.43 \pm 0.20$	$0.94 \pm 0.01$	$0.27 \pm 0.10$
L152R1	$1.03 \pm 0.08$	$0.75 \pm 0.03$	$1.19 \pm 0.07$	$0.73 \pm 0.22$
L156R1	$1.74 \pm 0.16$	$0.57 \pm 0.02$	$1.62 \pm 0.24$	$0.66 \pm 0.09$
Y187R1	$2.00 \pm 0.10$	$1.56 \pm 0.33$	$2.00 \pm 0.07$	$1.02 \pm 0.08$
W212R1	$1.03 \pm 0.29$	$0.08 \pm 0.02$	$1.12 \pm 0.40$	$0.15 \pm 0.01$
I235R1	$6.64 \pm 0.23$	$1.37 \pm 0.24$	$5.89 \pm 0.11$	$1.19 \pm 0.19$
V238R1	$1.40 \pm 0.12$	$0.48 \pm 0.01$	$1.24 \pm 0.02$	$0.49 \pm 0.06$
A263R1	$1.63 \pm 0.02$	$0.17 \pm 0.04$	$1.62 \pm 0.13$	$0.22 \pm 0.05$
F266R1	$3.80 \pm 0.27$	$1.01 \pm 0.10$	$3.65 \pm 0.49$	$1.45 \pm 0.07$

\*Accessibility parameter for air (20% O<sub>2</sub>)

†Accessibility parameter for ~30-100 mM NiEDDA.

**Table S3: Accessibility and depth parameters**

Labelling site	$\Delta\text{N-GlpG}$	$\Delta\text{N-GlpG}$	GlpG	GlpG
	$\Phi$	Depth (Å)	$\Phi$	Depth (Å)
I102R1	1.77	13.4	2.22	15.6
I109R1	0.03	5.1	0.38	6.5
F135R1	0.96	9.5	1.34	11.3
L152R1	0.31	6.4	0.53	7.4
L156R1	1.12	10.3	0.89	9.2
Y187R1	0.27	6.2	0.68	8.2
W212R1	2.50	16.9	1.93	14.4
I235R1	1.59	12.5	1.62	12.7
V238R1	1.06	10.0	0.94	9.4
A263R1	2.29	15.9	1.97	14.4
F266R1	1.33	11.3	0.92	9.3

$$\text{depth (\AA)} = 4.81\Phi + 4.9$$