

## Supporting Information

### *Amyloid $\beta$ fibrils assembled on ganglioside-enriched membranes contain both parallel $\beta$ -sheets and turns*

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**Figure S1. AFM images of a GM1/sphingomyelin/cholesterol (20:40:40) membrane in water.**

**Figure S2. Raw (blue line) and second-derivative (red line) reflection-absorption amide I and II spectra of A $\beta$ <sub>40</sub> fibrils deposited for 15 min–72 h on GM1/sphingomyelin/cholesterol (20:40:40)(A) and GlcCer/sphingomyelin/cholesterol (20:40:40)(B).**

**Table S1. Peak assignment of reflection-absorption spectra collected from GM1- or GlcCer-enriched membranes incubated with A $\beta$ <sub>40</sub>.**

Wavenumber (cm <sup>-1</sup> )						Assignment <sup>*3</sup>	Reference
20% GM1 <sup>*1</sup>				20% GlcCer <sup>*2</sup>			
15 min	24 h	48 h	72 h	15 min	72 h		
3316	3318	3295	3293	3315	3292	O-H, N-H stretching	[1]
2961	2960	2959	2959	2961	2962	Asymmetric stretching -CH <sub>3</sub>	[1][2]
2928	2928	2928	2926	2928	2927	Asymmetric stretching -CH <sub>2</sub> -	[1][2]
2879	2876	2875	2873	2879	2874	Symmetric stretching -CH <sub>3</sub>	[1]
2857	2855	2857	2854	2857	2853	Symmetric stretching -CH <sub>2</sub> -	[1][2]
1742	1740	1742	1745	1745	1746	C=O stretching	[2]
1676	1672	1665	1663	1678	1668	Amide I	[2][3]
1538	1540	1542	1541	1539	1542	Amide II	[2][3]
1467	1468	1457	1456	1467	1466	Scissoring bending -CH <sub>2</sub> -	[1][2]
1381	1379	1383	1385	1380	1390	Scissoring bending -CH <sub>3</sub>	[1][2][3]
1240	-	1241	1241	1238	1239	PO <sub>2</sub> <sup>-</sup> asymmetric stretching	[2]
1057	1061	1056	1074	1057	1064	PO <sub>2</sub> <sup>-</sup> symmetric, C-O stretching	[2]

<sup>\*1</sup>, POPC + GM1/sphingomyelin/cholesterol (20:40:40) bilayer; <sup>\*2</sup>, POPC + GlcCer/sphingomyelin/cholesterol (20:40:40) bilayer; <sup>\*3</sup>, as shown in **Table 1**.

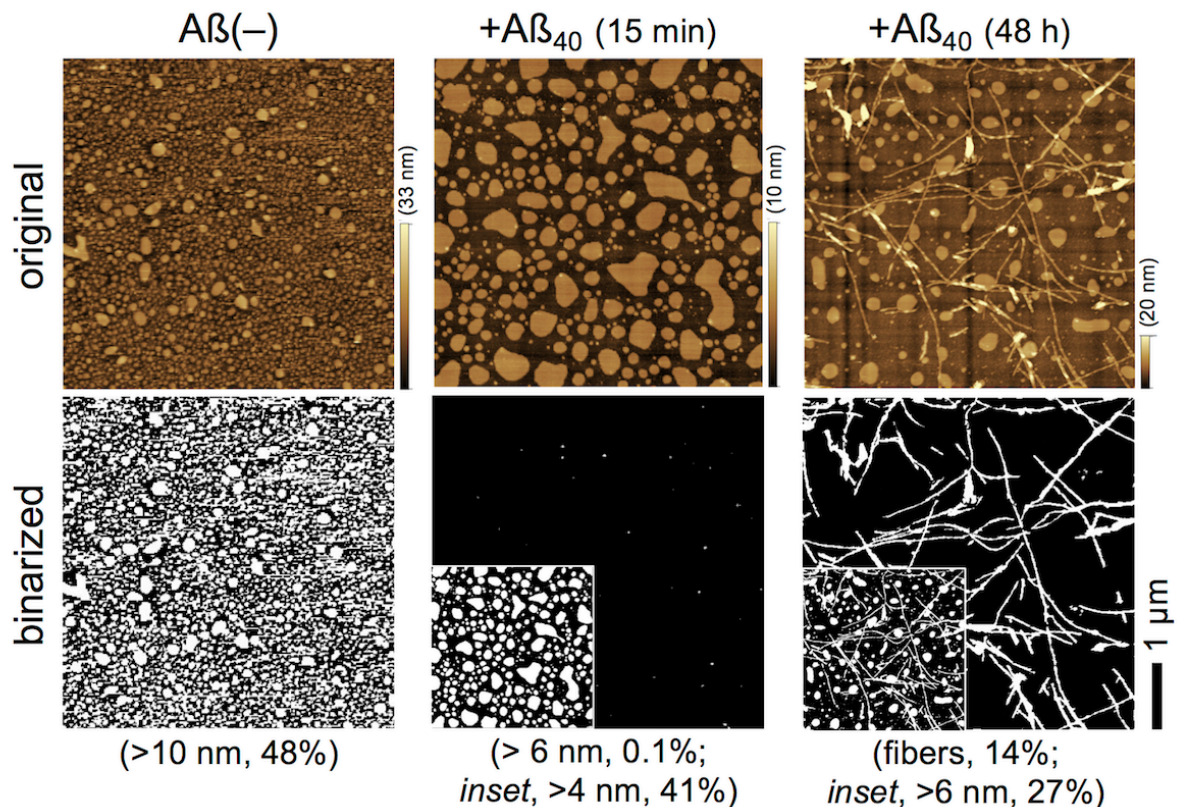
Assignments of 20% GM1 and 20% GlcCer at 0 min are shown as "POPC+GM1" and "POPC+GlcCer" in **Table 1**, respectively.

[1] Gun, J.; Iscovici, R.; Sagiv, J., *J. Colloid Interface Sci.* 1984, *101* (1), 201-213.

[2] Dreissig, I.; Machill, S.; Salzer, R.; Krafft, C., *Spectrochimica Acta Part A* 2009, *71* (5), 2069-2075.

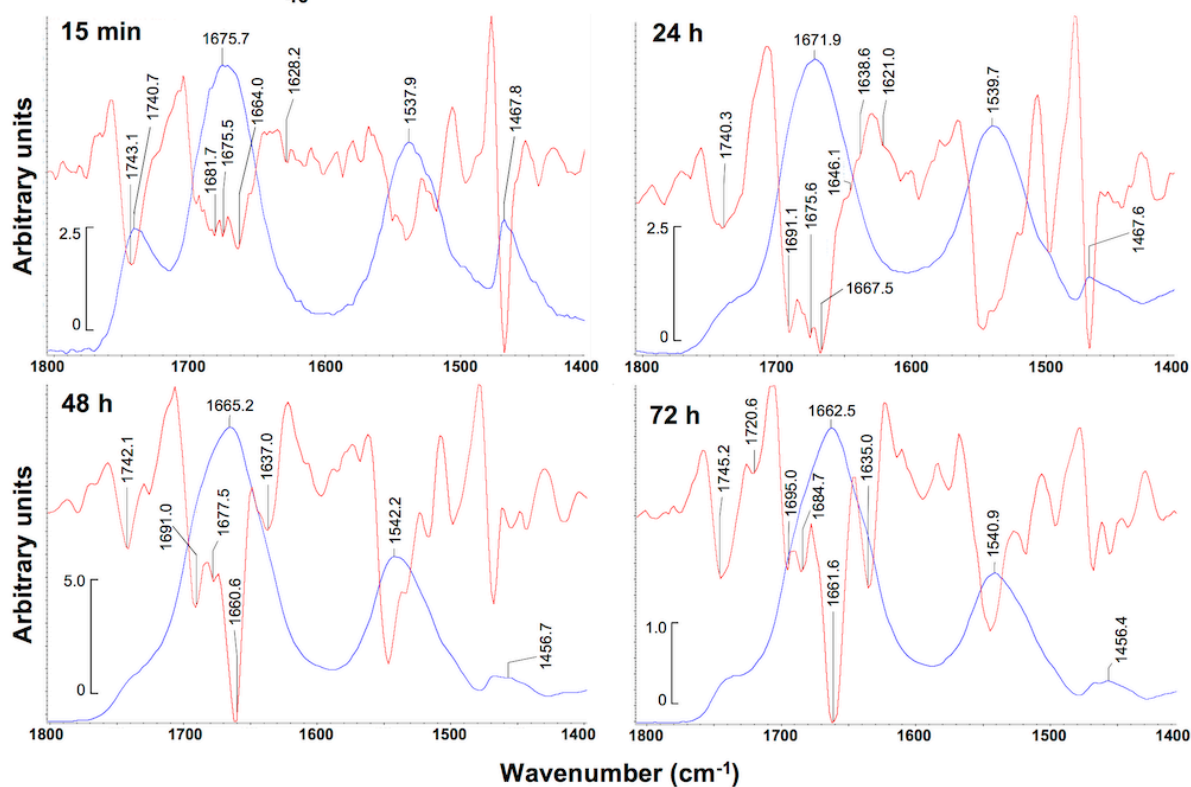
[3] Moore, D. J.; Rerek, M. E.; Mendelsohn, R., *J. Phys. Chem. B* 1997, *101* (44), 8933-8940.

## GM1/sphingomyelin/cholesterol (20:40:40) + A $\beta$ <sub>40</sub> in water



**Figure S1. AFM images of a GM1/sphingomyelin/cholesterol (20:40:40) membrane in water.** The membrane was incubated with 10  $\mu$ M A $\beta$ <sub>40</sub> in PBS for 15 min and 48 h at 25 °C, washed, and imaged in water (*upper*). Surface heights are indicated by color bars. Binarized AFM images were obtained by thresholding at 4–10 nm from the bottom, and percentages represent the total areas higher than the indicated height (*lower*). Fibrous A $\beta$ <sub>40</sub> after 48 h of incubation was extracted from the binarized image (14%; *lower right*). Scale bar, 1  $\mu$ m.

### A GM1-enriched + A $\beta$ <sub>40</sub>



### B GlcCer-enriched + A $\beta$ <sub>40</sub>

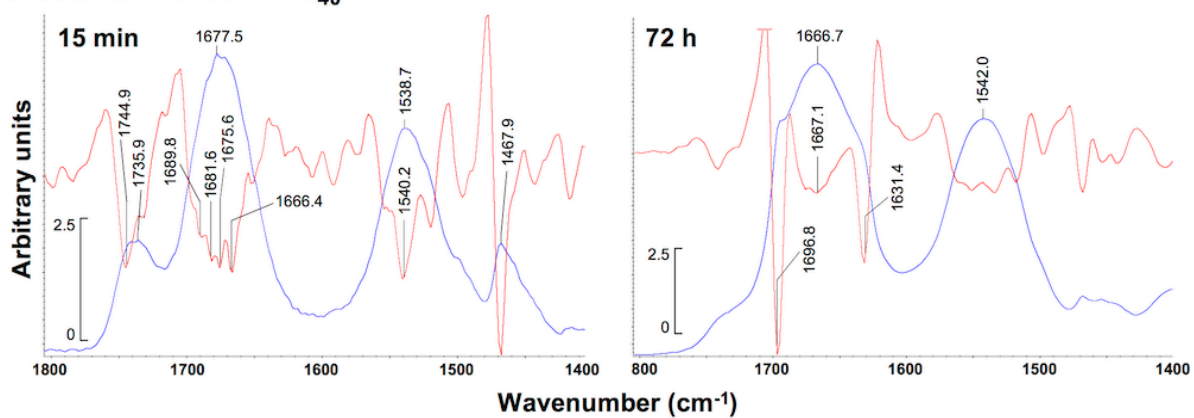


Figure S2. Raw (blue line) and second-derivative (red line) reflection-absorption amide I and II spectra of A $\beta$ <sub>40</sub> fibrils deposited for 15 min–72 h on GM1/sphingomyelin/cholesterol (20:40:40)(A) and GlcCer/sphingomyelin/cholesterol (20:40:40)(B).