THE EFFECT OF THE EXTERNAL QI OF QIGONG ON THE LIPOSOME PHASE BEHAVIOR

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Introduction

In an effort to explore the effect of the external Qi of Qigong on the biomembrane, we investigated the effect of external Qi on the phase transition of dipalmitoyl phosphatidyl choline (DPPC) liposome (artificial lipid membrane) using Differential Scanning Calorimetry (DSC). The experiments were conducted in the spring of 1987.

Materials

The DPPC was obtained from Sigma Company, U. S. A. The calorimeter, model 1090B, was supplied by Du Pont Company, U.S.A. The precision of thermal flux measurement was 1 mW/cm.

The DPPC liposome was prepared as follows: 2 mg of phospholipid were accurately weighed and added to 100 μl of PBS (140 mM $NaCl$, 5 mM Na_2HPO_4, NaH_2PO_2, pH 7.4). The suspension was vortexed to break up the phospholipid and then sonicated in a bath sonicator at 50^oC.

Experimental Procedure

After the DPPC liposome was prepared, a sample of 10 μl was taken with a microsyringe and injected into an aluminum sample holder for the DSC measurement. As a control experiment, the sample was measured three times during a seven hour period from the end of sample preparation to the beginning of the Qi experiments. The phase transition of the DPPC liposome from gel phase to liquid phase occurs at 41.5^oC. As indicated by the repeated measurement, the peak position of the phase transition did not change and the sample was stable. Next, the sample was placed by researchers in a Qi treatment room to which external Qi was subsequently emitted. Inside the Qi-treatment room, Dr. Yan Xin emitted external Qi to the sample for 5 to 10 minutes without touching it. The sample was then taken out and sent back by the researchers to the measurement room for the DSC measurement. During the experiment, Dr. Yan Xin never touched the samples. The process of the Qi-treatment and subsequent DSC measurement was repeated 2 to 3 times for each sample. The DSC scanning range was from 20 to 60^oC, the rate of temperature increase was 2^oC/min. Data were recorded and processed using thermal analysis software on a personal computer.

The Qi Emission Method

In addition to the direct Qi emission to samples in the Qi treatment room, Dr. Yan Xin also emitted external Qi from a long distance, about 3 to 9 km away from the samples. The time and duration of the Qi emission was set up by communication through telephone.

Results

In this experiment, a total of five samples were tested with 11 sessions of Qi emissions - twice in the Qi treatment room, once at 20 m outside of the building, twice 3 km away, and 6 times 9 km away from the samples.

The result of each measurement was clear and dramatic, and did not change due to the longer distances between the sample and the Qi emission site. The results from samples #1 and #2 are shown in Table 1 and Figure 1. All measurements showed that after the Qi treatment of the DPPC liposomes, in addition to the original phase transition peak position at 41.5^oC, a new large thermal absorption step occurred at about 46^oC. The thermal flux of this new step was 10 times greater than that of the original peak at 41.5^oC. More DSC measurements were conducted on sample #1 in the next 6 days and the shape of its DSC curve was essentially unchanged, see Figure 2.

Table 1: The conditions and results of DSC measurements conducted on samples #1, #2 and #3.

Sample information		Time of measurement	Temperature of phase transition (^oC)	Thermal absorption step	
				Peak position (^oC)	Width (^oC)
background	right after sample prep.	16:00	41.4		
	5 hrs later	21:00	41.6		
	divided into 3 samples				
	#1	23:33	41.5		
	#2	00:11	41.7		
Average 41.55±0.08					
After nth Qi emission					
Sample #1	$n = 1$	00:33	41.6	48	6.4
	$n = 2$	01:18	41.6	49	7.4
Sample #2	$n = 1$	01:48	41.7	46-48	4.3-6.3
	$n = 2$	04:05	41.7	51.5	9.8
Sample #3	$n = 1$	02:09	41.7	47	5.3
	$n = 2$	03:09	41.6	47.5	5.9
	$n = 3$	03:30	41.7	49.7	8
Average 41.66±0.05					
Sample #1	on the day of experiment	01:18	41.6	49	
	2nd day	10:30	41.6	48.5	
	3rd day	10:45	41.6	48	

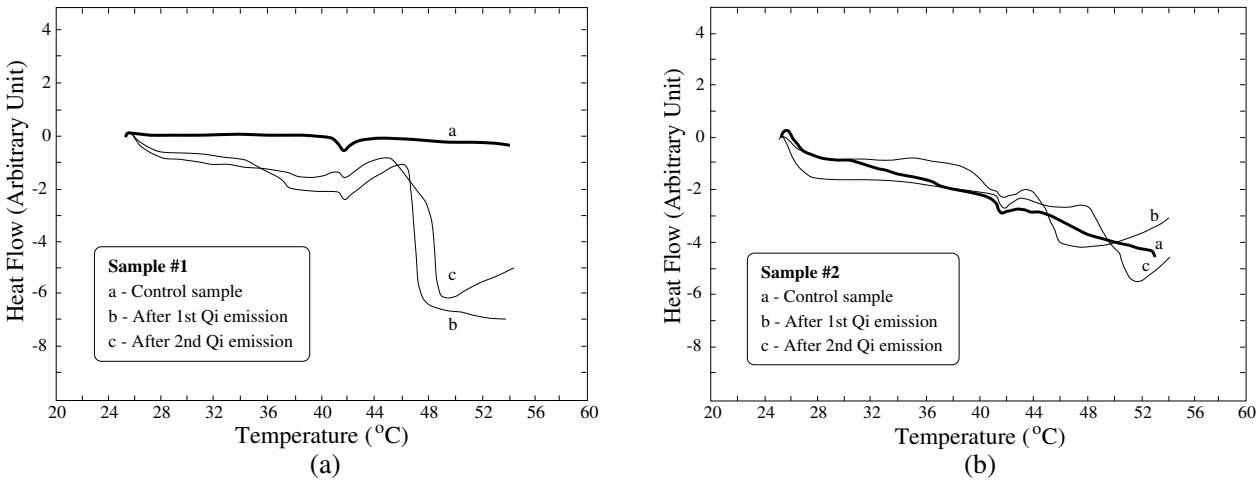

Figure 1: The Differential Scanning Calorimetry curves of DPPC liposome samples with and without Qi treatment. Note the large extra heat absorption step for samples treated with Qi.

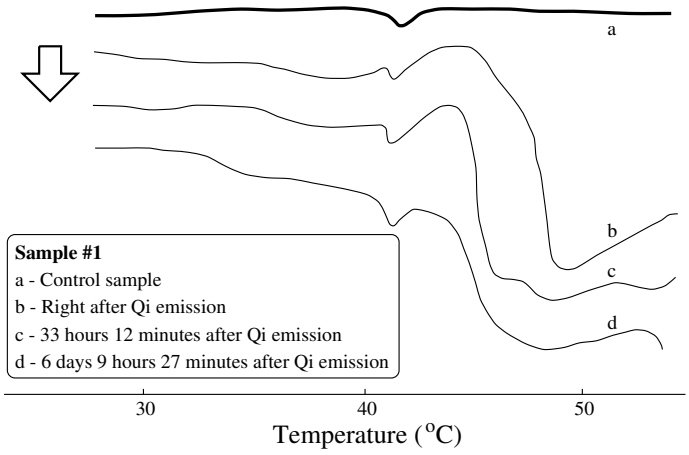

Figure 2: The Differential Scanning Calorimetry curves of sample #1 taken during the six days after the Qi emission. Note the shape of the DSC curve of the Qi-treated sample #1 was essentially unchanged with time.

Discussion

1) The stability of the DPPC liposome

Is it possible that the thermal absorption step at 46^oC was caused by the instability of the DPPC liposome?

DPPC is a type of relatively stable phospholipid. In cell membrane studies, it is often made into liposome as a model membrane for the study of the structure and function of cell membranes. Previously, we incorporated fluorescein calcein within DPPC liposomes. If there were any defects in the liposome membrane caused by degradation of the liposome, there would be leakage of fluorescein calcein. Therefore observation of the fluorescein calcein leakage could be used to identify the stability of the liposome. During a previous nine-month-long observation, no fluorescein calcein leakage was observed. The duration of each of our experiments was not longer than 5 hours; 12 hours if the time for sample preparation was included. Thus, the liposome was reliably stable.

After the first emission of external Qi, the thermal absorption step of sample #2 was at 46^oC, but after the second emission of external Qi, it shifted to 51^oC. From the 6-day tracing measurement on sample #1 we know that the thermal absorption step of the sample was stable and that it was impossible to vary by 5^oC or more in a very short period of time, so this phenomenon can only be explained by the effect of the external Qi.

2) The study of the thermal absorption step

It is well known that if DPPC does not degrade and keeps its molecular structure, its phase transition point is at about 41.5^oC without any other phase transition peak present. The large thermal absorption step at 46^oC or 51^oC suggests certain changes in the molecular structure of DPPC, for example, the degradation of its polar head portion, the breakage of its fatty acid chain, or the occurrence of free radicals.

The thin-layer chromatography (TLC) was then used to analyze the unusually large thermal absorption step from sample #4. It was discovered that the choline ($(CH_3)_3N(OH)$-CH_2CH_2-OH) of phosphatidyl choline (PC) in the polar head of some DPPC was degraded to phosphatidyl ethanolamine (PE, $NH_2CH_2CH_2OH$).

Conclusions

The effect of the external Qi of Qigong on the phase behavior of dipalmitoyl phosphatidyl choline (DPPC) liposome was investigated using Differential Scanning Calorimetry (DSC). The external Qi induced an additional large thermal absorption step at 46^oC or 51^oC. The thermal flux of the new step was ten times larger than that of the original phase transition absorption peak at 41.5^oC. The new thermal absorption step was possibly caused by a degradation of choline ($(CH_3)_3N(OH)$-OH) of phosphatidyl choline (PC) in the polar head of some DPPC to phosphatidyl ethanolamine (PE, $NH_2CH_2CH_2OH$).

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