**Supplemental data**

We have added validation data with SH-SY5Y human neuroblastoma cell lines (SH-SY5Y). The SH-SY5Y cells exposed to 250 μM H2O2 for 24 h were treated with different concentrations of caleolarioside B, paraboside B, and paraboside II (3.125, 6.25, 12.5, 25, and 50 μM). We examined the effects of caleolarioside B, paraboside B, and paraboside II on H2O2-induced cell viability.

**Materials and methods**

**Cell culture**

SH-SY5Y cells were obtained from the Cell Bank at the China Academy of Science (Shanghai, China). The cells were maintained at 37°C in a 5% CO2 incubator (Thermo, USA), in DMEM (Gaithersburg, MD, USA) supplemented with 1% penicillin/ streptomycin and 10% FBS (Hyclone, Waltham, MA, USA).

**MTS assay**

Confluent cells were harvested and plated at a density of 5×104 cells/mL, into 96 well plates. After overnight culture, the cells were treated with varying concentrations of caleolarioside B, paraboside B, and paraboside II (3.125, 6.25, 12.5, 25, and 50 μM) for 1 h. The treated cells were then exposed to 250 μM H2O2 (Tianjin, China) and incubated 24 h. After incubation, cell viability was determined using the MTS (Madison, USA) assays. Absorbance of each well was read at 490 nm.

**Statistical analysis**

Data were analyzed using SPSS 19.0, and the results are presented as the means with standard deviation (SD) of three independent experiments. Values of *p* < 0.05 were considered to indicate statistically significant differences.

**Results**

**Effects of** **caleolarioside B, paraboside B, and paraboside II on viability of H2O2-induced SH-SY5Y cells**

To determine the neuroprotective effects of caleolarioside B, paraboside B, and paraboside II against oxidative stress in SH-SY5Y cells, the viability was measured by MTS assay. As illustrated in Figure 1(a, b), 250 μM H2O2 treatment decreased the cell viability to 51.65% compared with control group (100%). However, caleolarioside B and paraboside B treatment significantly increased the cell viability. In particular, treatment with 50 μM restored cell viability to 96.62% and 90.76%, respectively. Likewise, after paraboside II treatment significantly increased the cell viability, being 84.05% at 25 μM concentrations best (Figure 1(c)).



**Figure 1.** Effects of caleolarioside B, paraboside B, and paraboside II on cell viability in hydrogen peroxideinduced SH-SY5Y cells. (Data are presented as means ± SD, *n* = 3). \*\*\**p* < 0.001 compared with control; ###*p* < 0.001, ##*p* < 0.01, #*p* < 0.05 compared with H2O2. (Control group; Model group: H2O2; Treated group: caleolarioside B + 250 μM H2O2, paraboside B + 250 μM H2O2, paraboside II + 250 μM H2O2)

**Discussion**

Treatment of H2O2 resulted in decreased cell viability, however, caleolarioside B, paraboside B, and paraboside II treatment significantly attenuated the neuronal cell death, indicating that caleolarioside B, paraboside B, and paraboside II potentially blocked the H2O2-induced neuronal apoptosis. This result suggests that it will be necessary to verify the protective mechanisms of caleolarioside B, paraboside B, and paraboside II from neuronal damage in the future.