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APPENDICES

APPENDIX A
PREPARATION OF REAGENTS

Dulbecco Modified Eagle's medium (DMEM) 1,000 ml

1. Dissolve the following ingredients in 1,000 ml of distilled water.

DMEM	17.4 g
$NaHCO_3$	3.7 g
Sodium pyruvate	99 mg

2. Adjust pH of this solution to 7.3 by adding 1 N HCl / 1 N NaOH.
3. Sterile by filtration through 0.22 µm Sterivex-GS filter kit.
4. Store in a refrigerator at 4°C (Stable for 1 month).
5. Mix with 10% fetal bovine serum (FBS) before use (90 ml of medium + 10 ml of FBS).

Preparation of Hank's balanced salt solution (g/L)

1. Dissolve the following ingredients in 800 ml of distilled water.

KCL	0.40 g
KH_2PO_4	0.06 g
$MgCl_2.6H_2O$	0.10 g
$MgSO_4.7H_2O$	0.10 g
NaCl	8.00 g
$NaHCO_3$	0.35 g
$Na_22HPO_4•7H_2O$	0.09 g

2. Adjust volume of solution to 990 ml by adding distilled water and adjust pH of this solution to 7.4 by adding 1N HCl / 1N NaOH.
3. Add 10 ml of D-glucose (0.1 g/ml).
4. Sterile by filtration through 0.22 µm Sterivex-GS filter kit.
5. Store in a refrigerator at 4°C.

Preparation of D-glucose (0.1g/ml)

1. Dissolve 5g of D-glucose in distilled water and adjust volume to 50 ml (stock solution 0.1g/ml).
2. Sterile by filtration through 0.22 µm Sterile Millex-GV filter kit.

3. Pipette D-glucose solution into sterile conical tube
   (10 ml of D-glucose per one tube) and store in freezer.

Preparation of 0.25% Trypsin (50 ml)

1. Pipette 0.5 ml of D-glucose (0.1 g/ml) into beaker.
2. Add Hank's balanced salt solution.
3. Dissolve 0.125g of trypsin in this solution and adjust volume to
   50 ml by adding Hank's balanced salt solution.
4. Sterile by filtration through 0.22 μm Sterile Millex-GV filter kit.
5. Pipette 0.25% Trypsin solution into sterile conical tube
   (10 ml of trypsin per one tube).
6. Store in freezer.

Preparation of 0.01% DNase I

1. Dissolve 2 mg of DNase I in 10 ml of Ca^{2+} Mg^{2+} free Hank's solution.
2. Sterile by filtration through 0.22 μm Sterile Millex-GV filter kit.
   (stock solution of 0.02% DNase I).
3. Dilute this solution with Ca^{2+} Mg^{2+} free Hank's solution (1:1) before use.
4. Store in freezer.

Preparation of cytosine-B-D-arabinofuranoside (Ara C)

1. Dissolve 2.797×10^{-3} g in 10 ml of distilled water
2. Sterile by filtration through 0.22 μm Sterile Millex-GV filter kit.
3. Pipette this solution into sterile Eppendrof tube (1 ml per one tube).
4. Store in freezer.

Preparation of poly-L-lysine solution (100 ml)

1. distilled water (or 0.1 M Borate buffer, pH 8.4).
2. Sterile by filtration through 0.22 μm Sterile Millex-GV filter kit.
3. Pipette this solution into sterile conical tube (30 ml per one tube).
4. Store in a refrigerator at 4°C.

Preparation of Acrylamide gel

Solution A : 0.8 % methylene bis acrylamide, 50% acrylamide

Solution B : 4X Separating buffer (Main gel) 100 ml
(75 ml 2M Tris HCl, pH 8.8 + 4 ml 10% SDS + 21 ml DDW)

Solution C : 4X Stacking buffer (Top gel) 100 ml
(25 ml 2M Tris HCl, pH 6.8 + 4 ml 10% SDS + 71 ml DDW)

APS (ammonium persulfate) 10% APS in DDW

TEMED (N, N, N, N-tetramethylenediamine)

Solution A, B, APS, and TEMED	stored at 4 °C
Solution C	stored at room temperature
APS	prepared every week

The gel apparatus and spacers (1.5 mm thick) were assembly.

1. Preparation of separating gel

To make two plates of 12% acrylamide gel, the ingredients of separating gel are

Solution A	2.4 ml
Solution B	2.5 ml
DDW	5.1 ml

All of the ingredients were thoroughly mixed. The mixture was supplemented with 50 µl APS and 10 µl TEMED, then thoroughtly mixed and immediately pour the gel between the glass plates. Before gel polymerization was complete, 0.1% SDS in DDW was layered on the top of the separating gel (5 mm thick). Leave the separating gel until the gel completely polymerized approximately 20-30 min.

2. Preparating of stacking gel

Once the separating gel has completely polymerized, 0.1% SDS was remove from the top of the polymerized gel. To make stacking gel, the ingredients are

Solution A	400 ml
Solution C	1 ml
DDW	2.6 ml

All of the ingredients were thoroughly mixed. The mixture was supplemented with 30 µl APS and 5 µl TEMED, then thoroughtly mixed and immediately pour the gel between the glass plates. The comb were inserted between the two glass plates of

two sets of gel apparatus. The gels were leaved for approximately 30 min to polymerize.

3. Application of samples

Once the stacking gel has completely polymerized, the combs were gently removed. The wells were flushed out thoroughly with running buffer. The clips and sealing tapes were removed and set up the gel chamber. Running buffer was filled out both inner and outer chamber. Before loading samples and protein marker, all air bubbles between layers were removed by gentle rolling the chamber.

Running buffer

To make 1 liter of 1X running buffer, pH 8.3, the ingredients are

Tris	3 g
Glycine	14.4 g
SDS	1 g

All ingredients were dissolved in DDW with continuously stirring. The solution was adjusted volume to 1000 ml.

Transfer buffer

To make 1 liter of 1X transfer buffer, pH 8.1-8.4, the ingredients are

Tris	1.93 g
Glycine	9 g

All ingredients were dissolved in 800 ml DDW with continuously stirring. The solution was adjusted volume to 1000 ml. Before use, the solution was supplement with 200 ml methanol.

Tris-buffer saline. 0.1% Tween 20 (TBST)

To make 500 ml of 10X TBS, the ingredients are

2M Tris-HCl, pH 7.5	25 ml
Nacl	43.8 g

All ingredients were dissolved in DDW with continuously stirring. The solution was adjusted volume to 500 ml. Before use, the solution was diluted to 1X TBS and supplemented with 1 ml Tween 20.

Sample buffer

To make 50 ml of 3X sample (225 mM Tris HCl (pH 6.8), 6% SDS, 30% glycerol, 9% 2-mercaptoethanol and 0.009% bromphenol blue) for stock solution, the ingredients are

Tris HCl	22.5 ml of 0.5 M
SDS	3 g
Glycerol	10 ml
2-mercaptoethanol	4.5 ml
bromphenol blue	225 µl of 2%

All ingredients were dissolved in DDW with continuously stirring. The solution was adjusted volume to 50 ml. 3X sample buffer was aliquot into 1 ml/tube and stored at -20 C. Before use, the solution was diluted to 1X sample buffer (75 mM Tris HCl, pH 6.8, 2% SDS, 10% glycerol, 3% 2-mercaptoethanol and 0.003% bromphenol blue) with DDW, 3X sample buffer : DDW = 2:1.

Lysis buffer for Western blot analysis

To make 50 ml of lysis buffer (50 mM Tris HCl (pH 7.5), 150 mM NaCl, 20 mM EDTA, 50 mM NaF, 1% NP-40, 0.02% NaN_3 supplement with 1 mM phenylmethansulfonyl fluoride (PMSF), 2 µg/ml leupeptin and 2 µg/ml aprotinin), the ingredients are

Tris HCl	2.5 ml of 1M (pH 8)
NaCl	0.4383 g
EDTA	0.3722 g
NaF	2.5 ml of 1M NaF
NP-40	0.51 ml
NaN_3	0.01 g

All ingredients were mixed well in 40 ml DDW The lysis buffer was aliquot into 1ml/tube and stored at 4°C. Before use, the solution was supplemented with 200 µl of 50 mM PMSF, 20 µl of 1mg/ml leupeptin and 3.51 µl of 5.7 mg/ml aprotinin and the volume was adjusted to 10 ml.

APPENDIX A

PREPARATION OF REAGENTS

Dulbecco Modified Eagle's medium (DMEM) 1,000 ml

1. Dissolve the following ingredients in 1,000 ml of distilled water.

DMEM	17.4 g
$NaHCO_3$	3.7 g
Sodium pyruvate	99 mg

2. Adjust pH of this solution to 7.3 by adding 1 N HCl / 1 N NaOH.
3. Sterile by filtration through 0.22 µm Sterivex-GS filter kit.
4. Store in a refrigerator at 4°C (Stable for 1 month).
5. Mix with 10% fetal bovine serum (FBS) before use
   (90 ml of medium + 10 ml of FBS).

DMEM/Nutrient Mixture F-12 HAM 1,000 ml

1. Dissolve the following ingredients in 1,000 ml of distilled water.

DMEM/Nutrient Mixture F-12 HAM	15.6 g
$NaHCO_3$	1.2 g

2. Adjust pH of this solution to 7.3 by adding 1 N HCl / 1 N NaOH.
3. Sterile by filtration through 0.22 µm Sterivex-GS filter kit.
4. Store in a refrigerator at 4°C (Stable for 1 month).
5. Add supplement before use

Preparation of phosphate buffer saline solution 1000 ml

1. Dissolve the following ingredients in 1,000 ml of distilled water.

Mapnesium Chloride•6 H_2O	0.100 g
Potassium chloride	0.200 g
Sodium chloride	8.000 g
Potassium phosphate monobasic (anhydrous)	0.200 g
Sodium phosphate dibasic (anhydrous)	1.150 g

2. Adjust pH of this solution to 7.2-7.4 by adding 1 N HCl / 1 N NaOH.
3. Sterile by autoclave
4. Store in a refrigerator at 4°C

Preparation of Hank's balanced salt solution (g/L)

1. Dissolve the following ingredients in 800 ml of distilled water.

KCL	0.40 g
KH_2PO_4	0.06 g
$MgCl_2.6H_2O$	0.10 g
$MgSO_4.7H_2O$	0.10 g
NaCl	8.00 g
$NaHCO_3$	0.35 g
$Na_22HPO_4•7H_2O$	0.09 g

2. Adjust volume of solution to 990 ml by adding distilled water and adjust pH of this solution to 7.4 by adding 1N HCl / 1N NaOH.
3. Add 10 ml of D-glucose (0.1 g/ml).
4. Sterile by filtration through 0.22 μm Sterivex-GS filter kit.
5. Store in a refrigerator at 4°C.

Preparation of D-glucose (0.1g/ml)

1. Dissolve 5g of D-glucose in distilled water and adjust volume to 50 ml (stock solution 0.1g/ml).
2. Sterile by filtration through 0.22 μm Sterile Millex-GV filter kit.
3. Pipette D-glucose solution into sterile conical tube (10 ml of D-glucose per one tube) and store in freezer.

Preparation of 0.25% Trypsin (50 ml)

1. Pipette 0.5 ml of D-glucose (0.1 g/ml) into beaker.
2. Add Hank's balanced salt solution.
3. Dissolve 0.125g of trypsin in this solution and adjust volume to 50 ml by adding Hank's balanced salt solution.
4. Sterile by filtration through 0.22 μm Sterile Millex-GV filter kit.
5. Pipette 0.25% Trypsin solution into sterile conical tube (10 ml of trypsin per one tube).
6. Store in freezer.

Preparation of 0.01% DNase I

1. Dissolve 2 mg of DNase I in 10 ml of Ca^{2+} Mg^{2+} free Hank's solution.
2. Sterile by filtration through 0.22 μm Sterile Millex-GV filter kit.
   (stock solution of 0.02% DNase I).
3. Dilute this solution with Ca^{2+} Mg^{2+} free Hank's solution (1:1) before use.
4. Store in freezer.

Preparation of poly-L-lysine solution (100 ml)

1. Dissolve 10 mg of poly-L-lysine hydrobromide in 100 ml of distilled water
   (or 0.1 M Borate buffer, pH 8.4).
2. Sterile by filtration through 0.22 μm Sterile Millex-GV filter kit.
3. Pipette this solution into sterile conical tube (30 ml per one tube).
4. Store in a refrigerator at 4°C.

Preparation of Acrylamide gel

Solution A : 0.8 % methylene bis acrylamide, 50% acrylamide

Solution B : 4X Separating buffer (Main gel) 100 ml
(75 ml 2M Tris HCl, pH 8.8 + 4 ml 10% SDS + 21 ml DDW)

Solution C : 4X Stacking buffer (Top gel) 100 ml
(25 ml 2M Tris HCl, pH 6.8 + 4 ml 10% SDS + 71 ml DDW)

APS (ammonium persulfate) 10% APS in DDW

TEMED (N, N, N, N-tetramethylenediamine)

Solution A, B, APS, and TEMED	stored at 4 °C
Solution C	stored at room temperature
APS	prepared every week

The gel apparatus and spacers (1.5 mm thick) were assembly.

1. Preparation of separating gel

To make two plates of 12% acrylamide gel, the ingredients of separating gel are

Solution A	2.4 ml
Solution B	2.5 ml
DDW	5.1 ml

All of the ingredients were thoroughly mixed. The mixture was supplemented with 50 µl APS and 10 µl TEMED, then thoroughtly mixed and immediately pour the gel between the glass plates. Before gel polymerization was complete, 0.1% SDS in DDW was layered on the top of the separating gel (5 mm thick). Leave the separating gel until the gel completely polymerized approximately 20-30 min.

2. Preparating of stacking gel

Once the separating gel has completely polymerized, 0.1% SDS was remove from the top of the polymerized gel. To make stacking gel, the ingredients are

Solution A	400	ml
Solution C	1	ml
DDW	2.6	ml

All of the ingredients were thoroughly mixed. The mixture was supplemented with 30 µl APS and 5 µl TEMED, then thoroughtly mixed and immediately pour the gel between the glass plates. The comb were inserted between the two glass plates of two sets of gel apparatus. The gels were leaved for approximately 30 min to polymerize.

3. Application of samples

Once the stacking gel has completely polymerized, the combs were gently removed. The wells were flushed out thoroughly with running buffer. The clips and sealing tapes were removed and set up the gel chamber. Running buffer was filled out both inner and outer chamber. Before loading samples and protein marker, all air bubbles between layers were removed by gentle rolling the chamber.

Running buffer

To make 1 liter of 1X running buffer, pH 8.3, the ingredients are

Tris	3 g
Glycine	14.4 g
SDS	1 g

All ingredients were dissolved in DDW with continuously stirring. The solution was adjusted volume to 1000 ml.

Transfer buffer

To make 1 liter of 1X transfer buffer, pH 8.1-8.4, the ingredients are

Tris	1.93 g
Glycine	9 g

All ingredients were dissolved in 800 ml DDW with continuously stirring. The solution was adjusted volume to 1000 ml. Before use, the solution was supplement with 200 ml methanol.

Tris-buffer saline. 0.1% Tween 20 (TBST)

To make 500 ml of 10X TBS, the ingredients are

2M Tris-HCl, pH 7.5	25 ml
Nacl	43.8 g

All ingredients were dissolved in DDW with continuously stirring. The solution was adjusted volume to 500 ml. Before use, the solution was diluted to 1X TBS and supplemented with 1 ml Tween 20.

Sample buffer

To make 50 ml of 3X sample (225 mM Tris HCl (pH 6.8), 6% SDS, 30% glycerol, 9% 2-mercaptoethanol and 0.009% bromphenol blue) fot stock solution, the ingredients are

0.5 M Tris HCl	22.5 ml
SDS	3 g
Glycerol	10 ml
2-mercaptoethanol	4.5 ml
2% bromphenol blue	225 µl

All ingredients were dissolved in DDW with continuously stirring. The solution was adjusted volume to 50 ml. 3X sample buffer was aliquot into 1 ml/tube and stored at -20 C. Before use, the solution was diluted to 1X sample buffer (75 mM Tris HCl, pH 6.8, 2% SDS, 10% glycerol, 3% 2-mercaptoethanol and 0.003% bromphenol blue) with DDW, 3X sample buffer : DDW = 2:1

Lysis buffer for Western blot analysis

To make 50 ml of lysis buffer (50 mM Tris HCl (pH 7.5), 150 mM NaCl, 20 mM EDTA, 50 mM NaF, 1% NP-40, 0.02% NaN_3 supplement with 1 mM phenylmethansulfonyl fluoride (PMSF), 2 μg/ml leupeptin and 2 μg/ml aprotinin), the ingredients are

Tris HCl	2.5 ml of 1M (pH 8)
NaCl	0.4383 g
EDTA	0.3722 g
NaF	2.5 ml of 1M NaF
NP-40	0.51 ml
NaN_3	0.01 g

All ingredients were mixed well in 40 ml DDW The lysis buffer was aliquot into 1ml/tube and stored at 4°C. Before use, the solution was supplemented with 200 μl of 50 mM PMSF, 20 μl of 1mg/ml leupeptin and 3.51 μl of 5.7 mg/ml aprotinin and the volume was adjusted to 10 ml.

APPENDIX B

TABLES OF EXPERIMENTAL RESULTS

Table 2 The percentage of MTT reduction of $A\beta_{25-35}$-induced injury in cultured hippocampal neurons.

$A\beta_{25-35}$ (μM)	% MTT reduction (compared to control)	
	48 hr incubation	72 hr incubation
0	100.00 ± 0.00	100.00 ± 0.00
1	80.56 ±2.37*	78.89 ±2.44*
5	71.10 ±2.44*	53.07 ±4.30*,#
10	62.35 ± 2.69*	38.56 ±3.95*,#
15	47.07 ± 5.02*	34.24 ± 2.49*
20	41.77 ± 2.89*	31.50 ± 2.07*

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate. Asterisks refer significant differences from the control group: $^{*}P$ <0.01 (One-way ANOVA followed by Scheffe's post hoc testing), $^{\#}P$ <0.01 (student t test).

Table 3 The percentage of % LDH release of $A\beta_{25-35}$-induced cell death in cultured hippocampal neurons.

$A\beta_{25-35}$ (μM)	% LDH release (compared to control)	
	48 hr incubation	72 hr incubation
0	100.00 ± 0.00	100.00 ± 0.00
1	110.31± 4.68	115.17 ± 4.61
5	120.78 ± 8.98	154.59 ± 2.57*,#
10	134.96 ± 7.62*	231.77 ± 14.47*,##
15	156.95 ± 7.05*	283.20 ± 14.14*,##
20	168.92 ± 4.80*	313.47 ±16.21*,##

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate. Asterisks refer significant differences from the control group: $^{*}P$ <0.01 (One-way ANOVA followed by Scheffe's post hoc testing), $^{\#}P$ <0.01, $^{\#\#}P$ <0.001 (student t test).

Table 4 The percentage of MTT reduction of cultured hippocampal neurons treated with quercetin for 72 hr.

Quercetin (μM)	% MTT reduction (compared to control)
0.001	96.50 ± 1.33
0.01	93.60 ± 2.01
0.1	95.28 ± 1.96
1	92.14 ± 2.80
10	47.79 ± 6.54*
20	20.60 ± 0.45*
50	12.48 ± 0.45*
100	12.50 ± 0.75*

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate. Asterisks refer significant differences from the control group: *P <0.01 (One-way ANOVA followed by Scheffe's post hoc testing).

Table 5 The percentage of MTT reduction of co-exposure with quercetin at various concentrations for 72 hr on $A\beta_{25-35}$-induced neurotoxicity in cultured hippocampal neurons.

Co-exposure		% MTT reduction (compared to own control)
Quercetin	$A\beta_{25-35}$ (μM)	
0	0	100.00 ± 0.00
0	5	61.48 ± 1.42*
0.1	5	61.42 ± 1.95
1	5	55.50 ± 4.60
10	5	56.20 ± 2.97
50	5	54.46 ± 3.93
100	5	57.47 ± 4.07
1000	5	66.34 ± 4.71

Each value represented as mean ± SEM of eight samples from at least three independent experiments, each performed in duplicate. Asterisks refer significant differences from the control group: *P <0.01 (One-way ANOVA followed by Scheffe's post hoc testing).

Table 6 The percentage of MTT reduction of cultured hippocampal neurons treated with quercitrin or 17β-estradiol for 72 hr.

Concentration (μM)	% MTT reduction (compared to control)	
	17β-estradiol	quercitrin
0.001	105.14 ± 1.93	98.32 ± 1.77
0.01	104.26 ± 2.03	96.86 ± 1.83
0.1	101.38± 2.56	96.38± 1.72
1	106.20 ± 1.49	97.23 ± 1.30
10	102.51 ± 1.20	96.03 ± 2.40
20	103.31 ± 2.24	96.84 ± 2.22
50	101.81 ± 3.75	99.67 ± 2.37
100	96.45 ± 1.70	101.08 ± 2.35

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate.

Table 7 The percentage of MTT reduction of co-exposure with quercitrin at various concentrations for 72 hr on $A\beta_{25-35}$-induced neurotoxicity in cultured hippocampal neurons.

Co-exposure		% MTT reduction (compared to own control)
Quercitrin (μM)	$A\beta_{25-35}$ (μM)	
0	0	100.00 ± 0.00
0	5	55.62 ± 2.98$^{\#}$
0.1	5	75.71 ± 1.47
1	5	63.61 ± 1.45
10	5	63.76 ± 1.22
50	5	71.43 ± 2.26*
100	5	76.09 ± 2.81*

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate. $^{\#}P$ <0.05 significant differences from control cultures. $^{*}P$ <0.05 significant differences from $A\beta_{25-35}$ - treated cultures (One-way ANOVA followed by Scheffe's's post hoc testing).

Table 8 The percentage of MTT reduction of co-exposure with 17β-estradiol at various concentrations for 72 hr on $A\beta_{25-35}$-induced neurotoxicity in cultured hippocampal neurons.

Co-exposure		% MTT reduction (compared to own control)
17β-estradiol	$A\beta_{25-35}$ (μM)	
0	0	100.00 ± 0.00
0	5	54.15 ± 3.38#
0.1	5	56.89 ± 4.47
1	5	59.90 ± 3.59
10	5	72.14 ± 3.62
50	5	78.27 ± 5.07*
100	5	81.83 ± 4.71*

Each value represented as mean ± SEM of eight samples from at least three independent experiments, each performed in duplicate. #$P<0.05$ significant differences from control cultures. *P <0.05 significant differences from $A\beta_{25-35}$ -treated cultures (One-way ANOVA followed by Scheffe's post hoc testing).

Table 9 The percentage of LDH release of co-exposure with quercitrin or 17β-estradiol at 50 and 100 μM for 72 hr on $A\beta_{25-35}$ -induced neurotoxicity in cultured hippocampal neurons.

Co-exposure		% LDH release (compared to own control).
Treatment (μM)	$A\beta_{25-35}$ (μM)	
control	0	100.00 ± 0.00
control	5	168.99 ± 4.60#
17β-estradiol 50	5	134.60 ± 2.06**
17β-estradiol 100	5	127.45 ± 2.82**
quercitrin 50	5	145.02± 2.09*
quercitrin 100	5	140.52 ± 2.46*

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate. #$P<0.01$ significant differences from control cultures, *P <0.05 significant differences from $A\beta_{25-35}$ -treated cultures, **P <0.01 significant differences from $A\beta_{25-35}$ -treated cultures (One-way ANOVA followed by Scheffe's post hoc testing).

Table 10 The percentage of MDA level of co-exposure with quercitrin or 17β-estradiol at 50 and 100 μM for 72 hr on $A\beta_{25-35}$ -induced neurotoxicity in cultured hippocampal neurons.

Co-exposure		% MDA equivalence (compared to own control)
Treatment (μM)	$A\beta_{25-35}$ (μM)	
control	0	100.00 ±0.00
control	5	148.22 ±3.31#
17β-estradiol 50	5	115.18 ± 5.15**
17β-estradiol 100	5	106.63 ± 4.49**
quercitrin 50	5	125.95 ± 4.44*
quercitrin 100	5	117.17± 5.26*

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate. #P<0.01 significant differences from control cultures, *P <0.05 significant differences from $A\beta_{25-35}$ -treated cultures, **P <0.01 significant differences from $A\beta_{25-35}$ -treated cultures (One-way ANOVA followed by Scheffe's post hoc testing).

Table 11 The percentage of ROS level of co-exposure with quercitrin or 17β-estradiol at 50 and 100 μM at various times on $A\beta_{25-35}$ -induced neurotoxicity in cultured hippocampal neurons.

Co-exposure (μM)		% ROS level			
Treatment	$A\beta_{25-35}$	6 hr	12 hr	18 hr	24 hr
control	0	100.00±0.00	100.00±0.00	100±0.00	100.00 ±0.00
control	5	119.89±8.71	126.92±11.12	165.71±13.19*	151.35 ±7.10*
17β-estradiol 50	5	104.44±10.81	118.40±11.08	141.28±10.02	130.64 ±11.61
17β-estradiol 100	5	109.38±13.83	125.94±15.98	137.62±6.48	125.44 ±8.87
quercitrin 50	5	92.73±10.11	115.38±15.92	151.33±8.79	136.00 ±10.28
quercitrin 100	5	95.20±6.14	111.23±19.23	148.92±9.75	139.38 ±8.88

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate. *P<0.01 significant differences from control cultures (One-way ANOVA followed by Scheffe's post hoc testing).

Table 12 The percentage of GSH content of co-exposure with quercitrin or 17β-estradiol at 50 and 100 μM for 72 hr on $A\beta_{25-35}$ -induced neurotoxicity in cultured hippocampal neurons.

Co-exposure		% GSH content (compared to own control)
Treatment (μM)	$A\beta_{25-35}$ (μM)	
control	0	100.00 ± 0.00
control	5	34.58 ±5.53$^{\#}$
17β-estradiol 50	5	58.42 ± 4.73
17β-estradiol 100	5	64.69 ± 5.42*
quercitrin 50	5	50.98 ± 3.64
quercitrin 100	5	54.18 ± 4.75

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate. $^{\#}P<0.01$ significant differences from control cultures, $^{*}P<0.05$ significant differences from $A\beta_{25-35}$ -treated cultures (One-way ANOVA followed by Scheffe's post hoc testing).

Table 13 The SOD activity of co-exposure with quercitrin or 17β-estradiol at 50 and 100 μM for 72 hr on $A\beta_{25-35}$ -induced neurotoxicity in cultured hippocampal neurons.

Co-exposure		SOD activity (U/mg protein) (compared to own control)
Treatment (μM)	$A\beta_{25-35}$ (μM)	
control	0	255.77 ± 13.64
control	5	220.68 ± 9.83
17β-estradiol 50	5	241.86± 8.20
17β-estradiol 100	5	233.92 ±9.41
quercitrin 50	5	236.32 ±7.41
quercitrin 100	5	239.04 ±8.39

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate.

Table 14 The GPx activity of co-exposure with quercitrin or 17β-estradiol at 50 and 100 μM for 72 hr on $A\beta_{25-35}$ -induced neurotoxicity in cultured hippocampal neurons.

Co-exposure		% GPx activity (U/mg protein) (compared to own control)
Treatment (μM)	$A\beta_{25-35}$ (μM)	
control	0	167.38 ± 6.41
control	5	136.35 ± 4.75#
17β-estradiol 50	5	156.04 ± 6.19
17β-estradiol 100	5	150.75 ± 4.63
quercitrin 50	5	167.88 ± 6.13*
quercitrin 100	5	170.32 ± 4.61*

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate. #$P<0.05$ significant differences from control cultures, *$P<0.05$ significant differences from $A\beta_{25-35}$-treated cultures (One-way ANOVA followed by Scheffe's post hoc testing).

Table 15 The percentage of MTT reduction of pre-exposure with quercitrin or 17β-estradiol at 50 and 100 μM for 72 hr on $A\beta_{25-35}$ -induced neurotoxicity in cultured hippocampal neurons.

Treatment (μM) (Pre-exposure)	Incubation with $A\beta_{25-35}$ (μM)	% MTT reduction (compared to own control)
control	0	100.00 ± 0.00
Treated control	5	60.49 ± 3.11#
17β-estradiol 50	5	55.88 ± 2.51
17β-estradiol 100	5	64.63 ± 2.39
quercitrin 50	5	59.35 ± 2.05
quercitrin 100	5	62.83 ± 2.29

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate. #$P<0.05$ significant differences from control cultures (One-way ANOVA followed by Scheffe's post hoc testing).

Table 16 The percentage of MTT reduction of ER antagonist (ICI 182,780) on neuroprotective effect of quercitrin or 17β-estradiol on $A\beta_{25-35}$-induced neurotoxicity in cultured hippocampal neurons.

Co-exposure				% MTT reduction (compared to own control)
ICI	17β-estradiol 50	quercitrin 50	Aβ 5 μM	
-	-	-	-	100.00 ± 0.00
+	-	-	-	92.81 ± 2.11
-	-	-	+	59.31 ± 0.97#
-	+	-	+	80.98 ± 4.00*
-	-	+	+	78.09 ± 3.42*
+	+	-	+	76.09 ± 2.37
+	-	+	+	71.30 ± 3.47

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate. #$P<0.05$ significant differences from control cultures, *P <0.05 significant differences from $A\beta_{25-35}$-treated cultures (One-way ANOVA followed by Scheffe's post hoc testing).

Table 17 The percentage of MTT reduction of MEK inhibitor (PD98059)on neuroprotective effect of quercitrin or 17β-estradiol on $A\beta_{25-35}$-induced neurotoxicity in cultured hippocampal neurons.

Co-exposure				% MTT reduction (compared to own control)
PD	17β-estradiol 50	quercitrin 50	Aβ 5 μM	
-	-	-	-	100.00 ± 0.00
+	-	-	-	97.94 ± 1.07
-	-	-	+	52.90 ± 1.86#
-	+	-	+	77.35 ± 4.35*
-	-	+	+	75.55± 3.81*
+	+	-	+	68.37 ± 3.91
+	-	+	+	69.63 ± 4.38

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate. #$P<0.05$ significant differences from control cultures, *P <0.05 significant differences from $A\beta_{25-35}$-treated cultures (One-way ANOVA followed by Scheffe's post hoc testing).

Table 18 The percentage of MTT reduction of PI3K inhibitor (LY294002) on neuroprotective effect of quercitrin or 17β-estradiol on $A\beta_{25-35}$-induced neurotoxicity in cultured hippocampal neurons.

Co-exposure				% MTT reduction (compared to own control)
LY	17β-estradiol 50	quercitrin 50	Aβ 5 μM	
-	-	-	-	100.00 ± 0.00
+	-	-	-	94.64 ± 3.37
-	-	-	+	51.79 ± 2.36#
-	+	-	+	71.07 ± 3.43*
-	-	+	+	70.27 ± 2.79*
+	+	-	+	69.04 ± 3.31
+	-	+	+	65.33 ± 5.01

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate. #$P<0.05$ significant differences from control cultures, *P <0.05 significant differences from $A\beta_{25-35}$-treated cultures (One-way ANOVA followed by Scheffe's post hoc testing).

Table 19 Absorbance intensity of caspase-3 activity of co-exposure with quercitrin or 17β-estradiol at 50 and 100 μM for 72 hr on $A\beta_{25-35}$-induced neurotoxicity in cultured hippocampal neurons.

Co-exposure		Absorbance intensity (compared to own control)
Treatment (μM)	$A\beta_{25-35}$ (μM)	
control	0	0.19 ± 0.02
Treated control	5	0.35 ± 0.03#
17β-estradiol 50	5	0.27 ± 0.03*
17β-estradiol 100	5	0.26 ± 0.03*
quercitrin 50	5	0.28 ± 0.03*
quercitrin 100	5	0.27 ± 0.02*

Each value represented as mean ± SEM of six samples from at least three independent experiments, each performed in duplicate. #$P<0.05$ significant differences from control cultures, *P <0.05 significant differences from $A\beta_{25-35}$-treated cultures (One-way ANOVA followed by Scheffe's post hoc testing).

VITAE

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