

Evaluation Tests of Functional Components

Characterization of functions with biochemical, *in vitro* and *in vivo* approaches

Function	Biochemical	<i>in vitro</i>	<i>in vivo</i>
Anti-oxidant	SOSA, DPPH,ORAC	HUVEC CAA Assay	-
Anti-hypertension	Inhibition of ACE activity	Inhibition of ACE activity expressed on HUVEC	Inhibition of hypertension with spontaneous hypertensive rats
Anti-hyperglycemia	Inhibition of α -glycosidase activity	-	Inhibition of hyperglycemia with rats and mice
Anti-hypercholesterolemia	-	-	Inhibition of hypercholesterolemia with rats
Anti-osteoporosis	-	-	Osteoporosis animal models
Anti-obesity	-	Inhibition of lipid accumulation/ promotion of lipid catabolism with 3T3-L1 cell line	Inhibition of abdominal fat deposition with rats
Cell growth inhibition	-	Growth inhibition/ cytotoxicity/ apoptosis induction with P388 cell line	-
Anti-allergy	-	Degranulation Inhibition of RBL cell line	-
Immuno-stimulation/ anti-inflammation	-	Induction/ inhibition of NO production with RAW cell line	-
Inhibition of melanin deposition	-	Inhibition of melanin production/ tyrosinase activity with B16 cell line	-

Our service includes study design to reach your goal for not only both *in vitro* and *in vivo* tests but other relevant analyses.

Biochemical tests

Test	Function	Approach
Superoxide anion scavenging activity (SOSA)	Anti-oxidant	ESR measurement of scavenging activity for superoxide anion, one of typical ROS
DPPH radical scavenging activity	Anti-oxidant	Spectrometric measurement of scavenging activity for DPPH radical species, an artificial ROS
Oxygen radical absorbance capacity (ORAC)	Anti-oxidant	Fluorometric measurement of absorbance capacity for ROS, a newly proposed anti-oxidant index in food being prevalent as ORAC
Inhibition of ACE activity	Anti-hypertension	Inhibitory effect for activity of ACE (angiotensin converting enzyme), a closely related enzyme to hypertension, derived from rabbit lung
Inhibition of α -glucosidase activity	Anti-hyperglycemia	Inhibitory effect for activity of α -glucosidase, an essential enzyme for glucose intake across small intestine involved in the final cleavage step of carbohydrate to monosaccharide, derived from rat intestine

***in vitro* tests**

Test	Function	Approach
CAA (Cellular antioxidant activity)	Anti-oxidant	Fluorometric measurement of absorbance activity for ROS in cells
Inhibition of ACE activity on HUVEC	Anti-hypertension	Inhibitory effect for activity of ACE (angiotensin converting enzyme), a closely related enzyme to hypertension, expressed on the surface of HUVEC human umbilical vein endothelial cell
Growth inhibition of P388 leukemia cell line	Cell growth inhibition	Inhibitory effect for growth of P388 mouse leukemia cells, one of a cell line used as a typical panel members for anti-tumor action, evaluated by a colorimetric assay for redox enzyme activities in live cells

Test	Function	Approach
Degranulation inhibition of RBL cell line	Anti-allergy	Inhibitory effect for degranulation of RBL-2H3 rat mast cells stimulated with IgE, evaluated by a colorimetric assay for β -hexisosaminidase activity in released granules
Inhibition of lipid accumulation in 3T3-L1 cell line	Anti-obesity	Inhibitory effect for lipid accumulation in 3T3-L1 mouse cells through the differentiation from preadipocytes to adipocytes, evaluated by a colorimetric assay for lipid with Oil Red O staining
Promotion of lipid catabolism in 3T3-L1 cell line	Anti-obesity	Promotive effect for lipid catabolism in differentiated 3T3-L1 adipocytes, evaluated by a colorimetric assay for released glycerol
Induction/ inhibition of NO production with RAW cell line	Immuno-stimulation/ Anti-inflammation	Inducible/inhibitory effect on generation of nitrogen monoxide (NO) from RAW264 mouse macrophage cells without/with lipopolysaccharide (LPS) , evaluated as macrophage activation (immuno-stimulation) /inactivation (anti-inflammation) by a colorimetric assay for nitrite anion (an auto-oxidative product of NO)
Inhibition of melanin production with B16 cell line	Inhibition of melanin deposition	Inhibitory effect for melanogenesis in B16 mouse melanoma cells with/without melanocyte- stimulating hormone (α MSH)
Inhibition of tyrosinase activity in B16 cell line	Inhibition of melanin deposition	Inhibitory effect for activity of tyrosinase, an rate-limiting enzyme in melanogenesis pathway, derived from B16 mouse melanocytes

in vivo tests

Test	Function	Approach
Inhibition of hypertension with spontaneous hypertensive rats	Anti-hypertension	Anti-hypertensive effect on spontaneous hypertensive rats (SHR) under short/long term exposure
Inhibition of hyperglycemia with rats and mice	Anti-hyperglycemia	Anti-hyperglycemic effect on fasting rats/mice under sample dosage with glucose, evaluated by time dependent changes of blood glucose level
Inhibition of hypercholesterolemia with rats	Anti-hypercholesterolemia	Anti-hypercholesterolemic effect on rats under cholesterol rich feeding with sample, evaluated by blood cholesterol level
Inhibition of abdominal fat deposition with rats	Anti-obesity	Inhibitory effect for fat deposit on ovariectomised rats or genetically fatty rats, evaluated by abdominal fat weight and blood lipid levels
Osteoporosis animal models	Anti-osteoporosis	Anti-osteoporosis effect on ovariectomised rats under sample dosage, evaluated by bone minerals and Ca levels, and morphological observation with non- or decalcified bone preparation