Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Rat Urocortin 2 EIA Kit
Product number: YK191
Manufacturer: YANAIHARA INSTITUTE, INC.

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First issue: August 25, 2010

2. COMPOSITION, INFORMATION ON INGREDIENTS

Product Name	CAS Number
Rat Urocortin 2 EIA Kit	None

Kit components:

No.	Component	Quantity	Chemical name	Wt%	CAS No.	Chemical Formula
1)	Antibody coated plate	1 plate	Plate coated with rabbit anti rat urocortin 2 antibody ①			
2)	Standard	100 ng	Synthetic rat urocortin 2 (Lyophilized)②			
3)	Labeled antigen	1 vial	Biotinylated rat urocortin 2 (Lyophilized) ③			
4)	SA-HRP solution	12 mL	HRP labeled Streptavidin ④			
			Phenol ⑤	0.2%	108-95-2	C6H5OH
			Chroramphenicol ⑥	0.02%	56-75-7	C11H12CL2N2O2
5)	Enzyme substrate solution	12 mL	3,3 ' ,5,5 ' -Tetramethylbenzidine⑦		54827-17-7	C16H20N2
			Hydrogen peroxide ⑧	<1%	7722-84-1	H2O2
			N-Methyl-2-pyrrolidone ⑨	1-<20%	872-50-4	C5H9NO
6)	Stopping solution	12 mL	Sulfuric acid (1M) ⑩	5.5%	7664-93-9	H2SO4
7)	Buffer solution	25 mL	Citrate buffer with non specific reaction blocker including serum⑪			
			Citric acid, monohydrate ⑫	2.1%	5949-29-1	C6H8O7･H2O
8)	Washing solution (concentrated)	50 mL	Sodium chloride ⑬	18%	7647-14-5	NaCl
			Polyoxyethylene sorbitan monolaurate (Tween20) ⑭	1%	9005-64-5	C22H42O3
9)	Adhesive foil	3 pieces ⑮				

3. HAZARDS IDENTIFICATION

6) Sulfuric acid component causes a severe skin and eyes irritation.

4) Phenol can cause liver, kidney, bladder and cardiac damage.
Pre-existing heart or circulatory disorders may be aggravated by exposure.

Other reagents may be harmful if inhaled and ingested. May cause eye and skin irritation.

4. FIRST AID MEASURES

Inhalation: Immediately remove victim to fresh air. Consult a physician if necessary.

Eye contact: Immediately flush eyes with flooding amounts of running water for at least 15 minutes. Consult a physician if necessary.

Skin contact: Immediately remove contaminated clothes and shoes, flush skin with plenty of water or shower. Wash contaminated clothing and shoes. Consult a physician if necessary.

Ingestion: Immediately seek medical attention.

5. FIRE FIGHTING MEASURES

Flammable properties: Nonflammable
Extinguishing media: Foam, Carbon dioxide, dry chemical powder, soil, water
Fire fighting instructions: May emit toxic fumes under fire conditions. Wear full fire fighting protective equipment including self-contained breathing apparatus. Not contact to the components when extinguish fire.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Remove all ignition sources and ventilate. Wear suitable protective equipment. Avoid contact with skin and eyes. Keep off except persons concerned.
Environmental precautions: Prevent spills from entering sewers, watercourses or low area, and prevent from affecting environment.
Methods for Clean up: In case of spill of liquid material, take up or cover spilled material with ashes or other incombustible absorbents, and put in a container to be sealed. After completely picked up, dispose. In case of spill of solid or powder material, prevent causing dust, sweep and collect, and put in a container to be sealed. Wash the spill site with water.

7. HANDLING AND STORAGE

Handling: Obtain a package insert before use.
Read all the cautions for safety in the package insert before use.
Avoid strong light.
Avoid contact, inhalation and swallow.
Use only in open air or ventilated area.
Prevent from entering eyes.
Ventilate the area to keep concentration in air below exposure limits.
Avoid inhalation of mist, vapor and spray of material.
Avoid contact with eyes, skin and clothing
Do not smoke and eat while using this kit.
Wash hands thoroughly after handling.
Prevent from entering environment.
Handle materials with suitable protection.
Use suitable equipments.
Do not pipette by mouth.

Do not leak, overflow and scatter.
Do not fall down and damage.

Storage: **Store away from sunlight in a cool and dark place at 36-47˚F (2-8˚C).**

8. EXPOSURE CONTOROLS, PERSONAL PROTECTION

Engineering measures: **General ventilation and/or local exhaust ventilation as well as process isolation is necessary to minimize employee exposure and maintain exposure limits below exposure limits. Equip eye flushing facilities and shower rooms near operating place where this kit is handled or stored.**

Control parameter:
⑤ OSHA Final Limits; TWA= 1 ppm
ACGIH TLV(s); TWA= 1 ppm
⑧ ACGIH TLV(s); TWA= 1 ppm
⑩ OSHA Final Limits; TWA= 1 mg/m³
ACGIH TLV(s); TWA= 1 mg/m³, STEL 3 mg/m³
⑫ Administrative control level 3.0/0.59Q+1 mg/m3, Japan Society of Occupational Health(JSOH) 1mg/m3

Personal protection:
Respiratory protection; NIOSH and MSHA approved respirator
Hand protection; Suitable impervious gloves. PVC gloves for component 5) and 6).
Eye protection; Suitable safety glasses (goggles)
Skin protection; Suitable protective clothing

Others: **Wash hands thoroughly after handling materials.**

9. PHYSICAL AND CHEMICAL PROPERTIES

Component	1)	2)	3)	4)	5)	6)	7)	8)	9)
Appearance	Colorless plate containing white powder in each well	White color, lyophilized powder	White color, lyophilized powder	Orange color, Liquid	Colorless transparent, Liquid	Colorless transparent, Liquid	Light brown color, Liquid	Colorless transparent, Liquid	Colorless transparent Polymer sheet
pH	N.D	N.D	N.D	6.8	N.D	N.D	N.D	N.D	N.D
Melting point	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
Boiling point	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
Flash point	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
Explosive limits	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
Vapor pressure	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
Vapor density (air=1)	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
Specifics gravity	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D
Solubility in water	Soluble	Soluble	Soluble	Soluble	Soluble	Soluble	Soluble	Soluble	Insoluble
Decomposition temperature	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D

10. STABILITY AND REACTIVITY

Chemical stability: **Product is stable under normal handling.**
Shelf life: **Stable up to 6 months after manufacturing.**
Hazardous polymerization: **Will not occur.**

Conditions to avoid: Strong light (all components), heat, contact with oxidizing reagents 2), 4), 5), and 8).
Incompatibility with other materials: oxidizing reagents 2), 4), 5), and 8).
Hazardous decomposition products: Carbon monoxide, carbon dioxide, nitrogen oxides, halogen compounds and etc. may be formed by combustion 2), 3), 4) and 5).
Hydrogen sulfide, Sulfur oxides and etc. May be formed by combustion 6).
Carbon monoxide, carbon dioxide and etc. May be formed by combustion (all components except 6).

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11. TOXICOLOGICAL INFORMATION

Information as the mixture is not available.

Acute toxicity :

4) Phenol (oral, rat); LD50=340mg/kg
Chloramphenicol (oral, rat); LD50=2500mg/kg, ATE=319.8. Category 4.
Hazard statement; Harmful if swallowed
5) Hydrogen peroxide (oral, rat); LD50=311mg/kg
3,3 ' ,5,5 ' -tetramethyl benzidine; (oral, quail); LD50=316mg/kg;
N-Methyl-2-pyrrolidone; (oral, rat); LD50=3914mg/kg;
(oral mouse); LD50=5130mg/kg
8) Tween 20 (oral, rat); LD50=37000mg/kg
Sodium chloride (oral, rat); LD50=3000mg/kg.
4) Phenol (dermal, rat); LD50=670mg/kg, Category 3.
Information on other ingredients not available.
Hazard statement; Toxic in contact with skin
5) Hydrogen peroxide (dermal, rat); LD50=4060mg/kg
3,3 ' 5,5 ' -Tetramethyl benzidine (abdominal, mouse); LD50=135mg/kg;
N-Methyl-2-pyrrolidone; (dermal, rabbit); LD50=8g/kg;
6) Sulfuric acid (inhalation, rat); LD50=347ppm (4hour equivalent: 0.347mg/L), Category 2.
Hazard statement; Fatal if inhaled

Skin corrosion/irritation:

4) Phenol (skin, rabbit and human); Corrosive.
Chloramphenicol; Information not available. Not classified.
5) Hydrogen peroxide (skin); R-phase(s)=R35 (causes sever burns), content<1%, Not classified.
3,3 ' 5,5 ' -Tetramethyl benzidine; May cause pain, itch, and redness.
N-Methyl-2-pyrrolidone; May cause dry skin and redness. May be absorbed through skin.
6) Sulfuric acid (skin); pH<1, Category 1A-1C
Hazard statement; Causes severe skin burns and eye damage
8) Tween 20 (skin, human); 15mg/3days, Mild
Sodium chloride (skin, rabbit); 500mg/24H, Mild, Category 3
Hazard statement; Skin irritant

Serious eye damage/irritation:

4) Phenol (eye, rabbit); When phenol, in glycerin dilutions down to 10% or 5% aqueous solutions, was applied to the rabbit eyes, severe damage (complete destruction to opaque corneas) was seen.
Chloramphenicol; Information not available. Not categorized.
5) N-Methyl-2-pyrrolidone (eye, rabbit); Irritation with 100mg,
Hydrogen peroxide (eye, animal); Severe. Corrosive. Not classified.
3,3 ' ,5,5 ' -Tetramethyl-bezidine; May cause pain and irritant.
6) Sulfuric acid (eye, human); Incase of human accident, serious damage was seen.
Sulfuric acid (eye, rabbit); Medium irritation for 5% solution and severe irritation for 10% solution. pH<2. Category 1.
Hazard statement; Causes severe skin burns and eye damage
8) Tween 20 (eye); R-phase(s)=R36 (Irritating to eyes)
Sodium chloride (eye, rabbit); 10mg/24H, Medium 100mg/24H, Medium
Category 2B. Hazard statement; May cause eye irritation.

Respiratory or skin sensitization:

Respiratory sensitization

4) Phenol and chloramphenicol; Information not available

Skin sensitization

4) Phenol (skin, guinea pig); Negative in Mugnussen and Kligman skin sensitization test.
Phenol (skin, Mouse); Negative in MEST test 1.
Phenol (skin, human volunteer); Negative
Chloramphenicol (skin); May cause allergic skin reaction.
Not classified.
5) 3,3 ' ,5,5 ' -Tetramethyl-benzidine; Information not available.
N-Methyl-2-pyrrolidone; Information not available.

Germ cell mutagenicity:

4) Phenol; Information on heritable germ cell mutagenicity tests not available
Phenol; Positive in somatic cell mutagenicity tests (chromosome aberration test).
Chloramphenicol; Information not available. Category 1B.
Hazard statement; May cause genetic defects
5) Hydrogen peroxide; Positive in germ cell mutagenicity tests. Positive in mammal chromosome tests.
3,3 ' ,5,5 ' -Tetramethyl-benzidine; Information not available.
N-Methyl-2-pyrrolidone; Information not available.

Carcinogenicity: 4) Phenol; IARC group 3 (substances which can not be classified to human carcinogens)
Chloramphenicol; IARC group 2A (substances which may be carcinogenic to human). Not classified.
5) Hydrogen peroxide; IARC group 3 (substances which can not be classified

to human carcinogens). ACGIH group A3 (confirmed as animal carcinogen and relation to human is not unknown)
3.3 ' ,5,5 ' -Tetramethyl benzidine; ACGIH group A1 (substances confirmed as human carcinogen), IARC group 1 (substances which have human carcinogenicity). Hazard statement; Suspected of causing cancer

6) Sulfuric acid; Occupational exposure to mist of inorganic strong acids including sulfuric acid are classified to group 1 in IARC (to have carcinogenicity for human, group A2 in ACGIH (suspected human carcinogens) and group K in NTP (known to have carcinogenicity for human). With respect for the evaluation by IARC and current evaluation by NTP, it should be classified to category 1, however since sulfuric acid itself is classified to Category 4 in DFGOT and is not classified to carcinogen by any other organization.

Reproductive toxicity:

4) Phenol (animal); In dose not to be seen general toxicity for parental animals, decease in number of newborn was seen.
Chloramphenicol; Information not available. Category 1B
Hazard statement; May damage fertility or the unborn child

5) Hydrogen peroxide; In vitro experiment, effects to human sperm was seen. In animals, although no descriptions for general toxicity for parental animals, there are descriptions of effects to sperm motility, female estrous cycle, decrease in number of maternal animals to give birth and decrease in body weight of newborn animals. Content<1%
N-Methyl-2-pyrrrolidone; from animal experiment, there are the possibilities to affect human reproductivity.
Component 5) can not be classified.
Other ingredients; Information not available.

Specific target organ systemic toxicity/Single exposure:

4) Phenol (human); There are reports effects to human listed below.
[Effects to heart and blood vessel]
[Effects to nervous system like, excess respiratory rate, difficulty in breathing, dysrhythmia, cardiovascular shock, severe metabolic acidosis, methemoglobinemia, acute renal failure, renal disorder, dark urine and spasm]
[Heart dysrhythmia]
[Arrhythmia and bradycardia] etc.
Phenol (animal); There was a report of [Strong suppression of pupillary reflex]. Every effect in animal is seen within the guidance value ranges of Category 1.
Since these reports, respiratory organs, cardiovascular system, kidney and nervous system seems to be the target organs.
Chloramphenicol; Information not available.
Category 1 (Respiratory organs, cardiovascular system, kidney and nervous system)

Hazard statement; Causes damage to respiratory organs, cardiovascular system, kidney and nervous system.

5) Hydrogen peroxide; Irritation in nose, throat and respiratory duct for human and animals. Congestion in lung and trachea, lung edema, pulmonary emphysema, epithelium necrosis of trachea in animal within the guidance value ranges of Category 1were described. In human, headache, dizziness, tremor, spasm, benumbedness, faint and brain infarction were descried.
3,3 ' ,5,5 ' -Tetramethyl benzidine; Irritation in nose, throat and respiratory duct for human and animals. Cough and respiratory spasm.
Other ingredients; Information not available.
Component 5) can not be classified.

6) Sulfuric acid (human); Respiratory irritation symptoms like cough and shortness of breath is known in low dose inhalation.
Persistent effects like hypofunction of lung and fibrosis, and emphysema as well as cough, shortness of breath and hemosputum in high dose inhalation.
Sulfuric acid (guinea pig); Pulmonary bleeding and malfunction of lung in inhalation exposure for 8 hours.
Category 1 (Respiratory organs)
Hazard statement; Causes damage to respiratory organs.

Specific target organ systemic toxicity/Repeated exposure:

4) Phenol (human); There are reports of effects to human listed below.
[Increase in mortality rate caused by cardiovascular diseases]
[Neonatal hyper bilirubinemia]
[Nausea, vomition, diarrhea, abdominal pain, hemolytic anemia, methemoglobinemia, glomerulus denaturation, renal tubulonecrosis, papillary cell bleeding] and etc.
Phenol (animal); There are reports of effects to animals listed below.
[Significant decrease of red blood cell count, protein cast and renal tubulonecrosis in kidney, papillary bleeding, atrophy/necrosis of spleen/thymus, vacuolization of hepatocyte, severe effects to central nervous system, liver disorder]
Every effect in animal is seen within the guidance value ranges of Category 1.
Since these reports, cardiovascular system, liver, digestive tracts, vascular system, kidney, spleen, thymus and central nervous system seem to be the target organs.
Chloramphenicol; Information not available.
Category 1 (Cardiovascular system, liver, digestive tracts, vascular system, kidney, spleen, thymus and central nervous system)
Hazard statement; Causes damage to cardiovascular system, liver, digestive tracts, vascular system, kidney, spleen, thymus and central nervous system with long term or repeated exposure.

5) Hydrogen peroxide (human); Irritative to lung.

Hydrogen peroxide (dog); Fibrous tissue nidus in lung appeared frequently and mixture of atelectasis and emphysema fields were recognized within the dose of the guidance value ranges of Category 1 in the inhalation test of vapor.
Hydrogen peroxide (oral, rat); Effects to white blood cell count and hematocrit value, and hemolysis were seen within the dose of the guidance value ranges of Category 2.
N-Methyl-2-pyrrolidone; May cause dermatitis with prolonged or repeated exposure.
Other ingredients; Information not available.
Component 5) can not be classified
Hazard statement; Causes irritation to respiratory organs.

6) Sulfuric acid (inhalation, rat); Cell proliferation in larynx mucosa was recognized within the dose of the guidance value ranges of Category 1 in the inhalation exposure test for 28 days.
Sulfuric acid (inhalation, guinea pig); Disorders of respiratory tract and lung like nasal septum edema, emphysema, atelectasis, bronchiole hyperemia, edema, bleeding, thrombus were recognized within the dose of the guidance value ranges of Category 1 in the repeated inhalation test for 14-139 days.
Sulfuric acid (inhalation, monkey); Histological changes like Hyperplasia of the cells and hypertrophy of the wall in bronchiole were recognized within the dose of the guidance value ranges of Category 1 (0.048mg/L, 23.5Hr/Day) in the inhalation exposure test for 78 weeks in crab-eating macaque.
Category 1
Hazard statement; Causes damage to respiratory system with long term or repeated exposure.

12. ECOLOGICAL INFORMATION

Information as the mixture is not available.
Aquatic environmental toxicity/Acute phase:

4) Phenol; In crustaceans (Ceriodaphnia quadrangula), 48H LC50=3.1mg/L
Chloramphenicol; 96H LC50=15-42μg/L
Component 4) is not classified since estimated value of acute aquatic environmental toxicity with the simple adding method.

5) Hydrogen peroxide; In crustaceans (Ceriodaphnia quadrangula), 48H LC50=2.4mg/L
3,3’5,5’-Tetramethyl benzidine; In bacteria, LC50=9000mg/L;
In fish, 96H LC50=4000mg/mL
N-Methyl-2-pyrrolidone; 96H LC50 (bluegill.)= 832 mg/L; 96H LC50 (rainbow trout.)= 3,048 mg/L; non-hazardous to aquatic species
Component 5) is not classified since estimated value of acute aquatic environmental toxicity with the simple adding method.

6) Sulfuric acid; In fish (Bluegill), 96H LC50=16-28mg/L;
Hazard statement; Harmful to aquatic life

Aquatic environmental toxicity/Chronical phase:

4) Phenol; Phenol has rapid degradability (85% by BOD) and is estimated to have small bioaccumulative potential (log Kow=1.46)
Chloramphenicol; has rapid degradability
Component 4) is not classified.

5) Hydrogen peroxide; octanol/water distribution ratio (log Pow=1.36)

13. DISPOSAL CONSIDERATIONS

Dispose of all waste material including containers in accordance with all applicable laws and local environmental regulations.

14. TRANSPORT INFORMATION

	5)	6)
Marine regulations	IMO	IMO
UN No	1993	2796
Proper shipping Name	N-methyl-2-pyrrolidone Combustible liquid, N.O.S. Only in bulk; > 119 Gal	Sulfuric acid with not more than 51%
Class	Ignitable	8
Packing group	Not regulated	II
Marine pollutant	Not applicable	Not applicable
Aviation regulations	ICAO/IATA	CAO/IATA
UN No	1993	2796
Proper shipping name	N-methyl-2-pyrrolidone	Sulfuric acid with not more than 51%
Class	Ignitable	8
Packing group	Not regulated	II

Other components: Not restricted and not hazardous materials.

15. REGULATORY INFORMATION

EU Directive 1999/45/EC; classification, packaging and labeling of dangerous Preparations
SYMBOL : C as component 6)
R-phrases : 35 as component 6)
S-phrases : 26-45 as component 6)

EU Directive 75/442/EEC on waste and 91/689/EEC on hazardous waste with amendments.
Symblo: XN as component 5)
R-phrases : 34/36/37/38 as component 5)
S-phrases : 22-41 as component 5)

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
In case of accident or if you feel unwell, seek medical advice immediately.

EC index No. : ⑤=604-001-00-2, ⑦=259-364-6, ⑧=008-003-00-9, ⑨=212-828-1, ⑩=016-020-00-8
Other ingredients=Not listed.

Follow all the regulations in your country.

16. OTHER INFORMATION

Reference

1) Internal data of Yanaihara Institute, Inc.
2) Chemwatch MSDS
3) RTECS (2006)
4) EU RAR (2003)
5) SIDS (2001)
6) Environmental Risk Assessment of Chemicals Vol.3 (Ministry of environment, Japan) (2004)
7) ATSDR (1998)
8) SIDS (2001)
9) DFDS (2001)
10) EU- RAR (2002)
11) SIDS (2003)
12) CERI・NITE Hazard Assessment Report (2005)
13) NTP DB (Access on Dec., 2005)
14) Narotsky and Kavlock (1995)
15) EHC 161 (1994)
16) MSDS by Wako Pure Chemical Industries, Ltd.
17) ECETOC JACC (1993)
18) ACGIH (2001)
19) NITE Biodegradation and Bioconcentration of the Existing Chemical Substances
20) PHYSPROP Database (2005)
21) IUCLID (2000)
22) HSDB (2006)
23) JSOH Recommendation of Occupational Exposure Limits (1993)
24) IARC (1992)
25) ACGIH (2004)

The above information is believed to be correct to be the best of our knowledge and information, but does not purport to be all inclusive and should be used as only a guide. This product is intended to be used by expert persons having chemical knowledge and skill, at their own discretion and risk.
Yanaihara institute shall not be held liable for any damages resulting from handling or contact with the above product.
Users should determine the suitability of the information for their particular purpose.