(04) 量认苏字 (S0174) 号

Testing Center of Radiological Medical Research Institute, Soochow University

Test Report

ADULT SPO2 FINGER CLIP SENSOR

Biocompatibality Test

Sample Supplier

Unimed Medical Supplies Inc

Testing Center of Radiological Medical Research Institute, Soochow University
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Supplementary Explanation

1. If demur at the analysis report please raise it within 15 days by receiving the report, otherwise will not be accepted.
2. Testing report is void without analysis center seal.
3. Valid report must be signed by ones who analyzed, reviewed and issued it.
4. Any erasure renders a report null and void.
5. Testing result of supply sample is only responsible for the provided sample.
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Table of Contents

Introduction

A guinea pig maximization test of the material identified below was conducted t evaluate the potential to cause delayed dermal contact sensitization. The test article wa received on Dec 7, 2005. The method of Magnusson and Kligman, as reported in Allergi Contact Dermatitis in the Guinea Pig, 1970, was employed with adaptations for a test articl extract. The susceptibility of the Hartley guinea pig strain to a known sensitizing agen 1-chloro-2,4-dinitrobenzene (DNCB), has been substantiated at TCRSU with this metho under lab number TCRSU-2002-011 completed on March 28, 2002.

Materials

The sample provide by the sponsor was identified and handled as follows:

Test Article: ADULT SPO2 FINGER CLIP SENSOR
Size: /
Lot No: /
Storage Conditions: Room temperature
Vehicle: alcohol in saline 1:20 solution (AS)

Preparation: For each phase of this test, a ratio of 0.2g: 1ml(test article to volume o vehicle)was used for the test extract . The test article was extracted in AS at 37℃ for 24 hours. For the challenge phase ,the vehicle (withou test article)was similarly prepared to serve as the control .In addition ,the test article (as received)was cut into 2×2cm sections at the challenge phase .

Condition of Extracts:	TEST	CONTROL
	Induction I: clear with test article particulates*	Not applicable
	Induction II: clear with test article particulates	Not applicable
	Challenge: clear with test article particulates	Clear

*Filtered with a 0.8um filter disc to yield a clear particulate free extract

Additional Materials: Freund's Complete Adjuvant (FCA) was used at induction I, and a 10%(w/w)sodium lauryl sulfate (SLS)suspension in petrolatum was used for induction II.These materials were provided by the test facility .

Method

Test System:

Species: Albino Guinea pig Sex: Male
Source: Provided by Animal Center, TCRSU <Permit Code: SCXK(SU)2002-0008>
Body Weight Range: 308 grams to 375 grams at first treatment
Acclimation Period: Minimum 5days
Number of Animals: 15 Identification Method: Ear punch

Justification of Test System:

The albino guinea pig has been used historically for sensitization studies (Magnusson and Kligman ,1970) . The guinea pig is believed to be the most sensitive animal model for this type of study .the susceptibility of the guinea pig to a known sensitizing agent, 1-chloro-2,4-dinitrobenzene (DNCB) has been substantiated at TCRSU with this method .

Animal Management:

Husbandry : Refer to ISO 10993-10-2002 Annec c: Animal and husbandry.
Food: All-nutrient animal food Provided by Suzhou (Twin-lion) Experimental

Animal Food Science & Technology Service Co .Ltd.

Water: Drinking water met the sanitary standard

Housing: Animals were housed in groups in stainless steel suspended cages identified by a card indicating the lab number , animal numbers, test code , sex, animal code and first treatment date .

Environmental: *The room temperature was monitored daily .The recommended* temperature range for the guinea pig was 20-25^{0}C.

The room humidity was monitored daily .The recommended humidity range for the guinea pig was 30-70%.

Personnel: Associates involved were appropriately qualified and trained.

Selection: Only healthy, previously unused animals were selected .

Induction I:

TREATMENT GROUP(n)	CHALLENGE SITE	
	LEFT FLANK	RIGHT FLANK (SITE)
Test(10)	Control Vehicle	Test Article(upper) Test Extract(lower)
Control(5)	Control Vehicle	Test Article(upper) Test Extract(lower)

Each patch was secured to the skin with semiocculusive hypoallergenic adhesive tape. Th trunk of each animal was wrapped with an elastic bandage to maintain well-occluded sites fo the 24 hour exposure.

Observations for dermal reactions were conducted at 24,48,72,and 96 hours afte challenge patch removal . The sites were wiped gently with gauze after patch removal .Prio to scoring at each interval ,sites were wiped with 35%isopropyl alcohol .Scores were recorded in accordance with the criteria shown below:

SCORE	OBSERVATION
0	No visible reaction
0.5	Very faint erythema usually nonconfluent
1	Faint erythema usually confluent
2	Moderate erythema
3	Strong erythema with or without edema

The response , pattern, character, and duration of any test animal reactions were compared to any reactions in the control conditions .Any dermal inflammatory response at the test sites greater than that seen in any control condition was considered evidence of a potential allergic response .Background or artifactual reactions(0.5 score) were not counted as evidence of a sensitization response.

Based on the number of guinea pigs considered as sensitized, the allergenicity rating was assessed as follows:

%Reacting Testing Animals	Classification
0%	Not a Sensitizer
1~10%	Weak Sensitizer
11~30%	Mild Sensitizer
31~60%	Moderate Sensitizer
61~80%	Strong Sensitizer
81~100%	Extreme Sensitizer

Note: In the Magnusson and Kligman model, weak sensitization is not regarded as significant.

Result

Individual results of dermal scoring for the challenge appear in Table 1.Only in significant background reactions (scores of 0.5) were noted .No evidence of sensitization was observed.

Clinical Observations: All animals appeared clinically normal throughout the study .

Results and conclusions apply only to the test article tested .No further evaluation of these results is made by TCRSU. Any extrapolation of these data to other samples is the responsibility of the sponsor.

Conclusion

Under the conditions of this study , the as test article extract and the test article showed no significant evidence of causing delayed dermal contact sensitization in the guinea pig.

Table 1 GUINEA PIG SENSITIZATION DERMAL REACTIONS – CHALLENGE

Animal Number/ Group	HOURS FOLLOWING PATCH REMOVAL											
	24			48			72			96		
	SITE A	SITE B	SITE C*	SITE A	SITE B	SITE C*	SITE A	SITE B	SITE C*	SITE A	SITE B	SITE C*
1 Test	0	0	0	0	0	0	0	0	0	0	0	0
2 Test	0	0	0	0	0	0	0	0	0	0	0	0
3 Test	0	0	0	0	0	0	0	0	0	0	0	0
4 Test	0	0	0	0	0	0	0	0	0	0	0	0
5 Test	0	0	0	0	0	0	0	0	0	0	0	0
6 Test	0	0	0	0	0	0	0	0	0	0	0	0
7 Test	0	0	0	0	0	0	0	0	0	0	0	0
8 Test	0	0	0	0	0	0	0	0	0	0	0	0
9 Test	0	0	0	0	0	0	0	0	0	0	0	0
10Test	0	0	0	0	0	0	0	0	0	0	0	0
11control	0	0	0	0	0	0	0	0	0	0	0	0
12control	0	0	0	0	0	0	0	0	0	0	0	0
13control	0	0	0	0	0	0	0	0	0	0	0	0
14control	0	0	0	0	0	0	0	0	0	0	0	0
15control	0	0	0	0	0	0	0	0	0	0	0	0

Site A = Left Flank = AS control vehicle
Site B = Lower Right Flank = AS test extract
Site C = Upper Right Flank = 2×2cm patch of test article
*-mechanical trauma and/or hair loss due to the adhesive nature of the test article noted on each site

Skin Irritation Test

Summary

The test article, ADULT SPO2 FINGER CLIP SENSOR, was evaluated for primary ski irritation in accordance with the ISO 10993-Part 10-2002: Tests for Irritation an Sensitization. Observe and write down the skin responses on injection sites in 24, 48 and 7 hours respectively after injection. The skin responses include erythema and oedema. Grad the tissue reaction for erythema and oedema according to the classification system given i Table 1. According to what observed, the response of skin on testing side does not exceed that on the control side. The primary irritation index for the test article was calculated to b 0. The test result shows that leached solution of sample does not induce irritation to rabbi skin.

Study and Supervisory Personnel:

Mi zhisu

Mi Zhisu

Wang Hongyun

Wang Hongyun

Checked by:

Zhang Tongcheng

Date completed: Dec 16, 2005

Signed by: Zhang Tongcheng

Introduction

The test article, ADULT SPO2 FINGER CLIP SENSOR, was evaluated for primary skin irritation in accordance with the guidelines of the ISO 10993.10—2002 Part 10: Tests for irritation and sensitization. This study was to determine the potential skin irritation after the injection of sample solution into the animal back. The test article was received on Dec 7, 2005. Injections were applied on Dec 12, 2005.and the observations were concluded on Dec 15, 2005.

Materials

Test Article: ADULT SPO2 FINGER CLIP SENSOR
Size: /
Lot No: /
Storage Conditions: Room temperature
Sample and Control Preparation

The samples are rinsed with redistilled water and blotted up with filter paper. In a container with cut sample, add the leaching solution (0.9% NaCl injection solution) in the proportion of 1ml leaching solution to 0.2g sample. Seal up the container at 37℃ for 24 hours. The solution so prepared is termed as leached solution of sample. The control solution (0.9% NaCl) is obtained by same way but absent of sample.

Method

Test System:
Species: Three rabbits.
Breed: New Zealand white (single strain)
Source: Provided by Animal Center, TCRSU<Permit Code: SCXK (SU)2002-0008>
Sex: Female.
Body Weight Range: 1.8-2.0 kg at patching.
Age: Young adult
Acclimation Period: Minimum 5 days.
Number of Animals: Three
Identification Method: Ear tag

Justification of Test System:

The rabbit is specified as an appropriate animal model for evaluating potential skin irritants by the current ISO testing standards. The rabbit is widely used for this purpose and relative ranking of irritant scores can be determined.

Animal Management:

Husbandry: Refer to ISO 10993-10: 2002 Annex C: Animal and husbandry

Food: All-nutrient animal food provided by Suzhou (Twin-lion) Experimental Animal Food Science & Technology service Co., Ltd.

Water: Provided by Sanitary Standard for drinking water.

Housing: Animals were individually housed in stainless steel suspended cages identified by a card indicating the lab number, animal number, test code, sex, and date dosed.

Environmental: The room temperature was monitored daily. The temperature range for the rabbit was 20-25℃.The room humidity was monitored daily. The humidity range for the rabbit was 30-70%.

Personnel: Associates involved were appropriately qualified and trained.

Selection: Only healthy, previously unused, animals free from irritation or other dermatological lesions that could interfere with the test were selected.

Experimental Procedure

Clean the rabbit's naked skin with 75% alcohol. Choose ten points at 2cm intervals on one side of rabbit back and inject 0.2ml leached solution at each point. Similarly, on the other side of rabbit back. Choose five points at 2cm intervals and inject 0.2ml control solution at each point.

Observe and write down the skin responses of injection sites in 24h, 48h and 72h respectively after injection. The skin response include erythema, odema and necrosis as well. From weak to serious, the responses are differentiated by grade 0, 1, 2, 3, 4 on the basis of its extent. See table 1.

Result

According to what observed, the response of skin on testing side does not exceed that on the control side. Thus, it is identified as grade 0. See table 2.

Conclusion

The test result shows that leached solution of sample does not induce irritation to skin.

Record Storage

All raw data pertaining to this study and a copy of the final report are to be retained in designated SUFY archive files.

TCRSU was awarded Metrology Accreditation Certificate (No. S0174) by National Technology Supervision Bureau in Nov 1, 2004.

Table.1 Classification System for Skin Reaction

Reaction	Numerical Gradi
Erythema and Eschar Formation:	
No erythema	0
Very slight erythema (barely perceptible)	1
Well-defined erythema	2
Moderate erythema	3
Severe erythema (beet redness) to eschar formation preventing grading of erythema	4
Edema Formation:	
No edema	0
Very slight edema (barely perceptible)	1
Well-defined edema (edges of area well-defined by definite raising)	2
Moderate edema (raised approximately 1mm)	3
Severe edema (raised more than 1mm and extending beyond exposure area)	4
Total possible score for irritation	8

Irritation Response Categories in the Rabbit	
Response Category	Mean score
Negligible	0 to 0.4
Slight	0.5 to 1.9
Moderate	2 to 4.9
Severe	5 to 8

NOTE: Other adverse changes at the skin sites shall be recorded and reported

Table 2. Dermal Observations

Rabbit No			Interval (hours)		
			24	48	72
1	Test	Erythema	0	0	0
		Edema	0	0	0
	Control	Erythema	0	0	0
		Edema	0	0	0
2	Test	Erythema	0	0	0
		Edema	0	0	0
	Control	Erythema	0	0	0
		Edema	0	0	0
3	Test	Erythema	0	0	0
		Edema	0	0	0
	Control	Erythema	0	0	0
		Edema	0	0	0

Supplementary Explanation

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Summary

The test article, ADULT SPO2 FINGER CLIP SENSOR was evaluated for cytotoxicity test in accordance with the ISO 10993-Part 5: Tests for cytotoxicity: in vitro methods. The testing sample solution is mixed with growing-well L-929 cell, and then incubated for 2 and 4 days. Observe the morphology and the cell growing on the culture bottle wall. The RGR (Relative Growth Rate) are 84% and 98% respectively by calculation on the basis of cell concentrations of different groups. The RGR of testing group is determined as Grade 1. This means the testing sample has no toxicity to L-929 cells.

Tested by: Sheng Weihua

Sheng Weihua

Xie Yufeng

Xie Yufeng

Checked by: Zhang Tongcheng

Zhang Tongcheng

Signed by:

Date completed: Feb 28, 2006

·Results and conclusion apply only to the test article tested.

TCRSU was awarded Metrology Accreditation Certificate (No. S0174) by National Technology Supervision Bureau in Nov 1, 2004.

Introduction

The test article, ADULT SPO2 FINGER CLIP SENSOR were evaluated for cytotoxicit test in accordance with the ISO 10993-5-1999 Part 5: Tests for cytotoxicity: in vitr methods .The purpose of this study was to determine the potential cytotoxicity of the testin article to L-929 cell.

Materials

1. Test Sample:

1.1Sample Supplier: Unimed Medical Supplies Inc
1.2Sample Name: ADULT SPO2 FINGER CLIP SENSOR
1.3Size: /
1.4Lot No: /
1.5Receiving Date: Feb 20, 2006

2. Sample and Control Preparation:

2.1 Testing sample group

The testing sample is treated in accordance with experiment requirements followed by sterilization in autoclave.

24 hours prior to experiment, add liquid culture medium in the proportion of 1ml culture medium to 0.2g testing sample, and then incubated at 37℃ for 24 hours. Thus, the sample solution is obtained.

2.2 For the positive controls, add con. 6.3% phenylhydroxide solution.

2.3 For the negative controls, add fresh 1640 liquid culture medium.

3. Culture medium:

RPMI 1640, calf serum, PBS, Pancreatin and double antibiotic.

Test method

1. Cell Strain: Recommended cell lines are American Type Culture Collection CCLI (NCTC clone 929).
2. Cell Culture

2.1 Take growing-well cell of strain L-929 to prepare cell soliquiod with concentration of 4×10^4 counts/ml in culture bottles. Proceed to next step after the cell grows up to monolayer.

2.2 Discard the liquid in culture bottles. In these culture bottles. Take testing group, add con. 50% sample solution, the positive control solution and the negative control solution. They are all incubated at 37℃. After 2 and 4 days incubation respectively, conduct the morphology evaluation and cell counting.

Results

The testing sample solution is mixed with growing-well L-929 cell, and then incubated for 2 and 4 days. Observe the morphology and the cell grow well sticking on the culture bottle wall. The RGR (Relative growth Rate) are 84% and 98% respectively by calculation on the basis of cell concentrations of different groups (the negative and positive controls).

Conclusion

By the experiment incubating L-929 cell using culture medium with sample solution, the RGR of testing group is determined as Grade 1. This means the testing sample has no toxicity to L-929 cell.

Record Storage

All raw data pertaining to this study and a copy of the final report are to be retained in designated TCRSU archive files.

Table 1 Classification system for the RGR

Grade	RGR (%)	Cytotoxicity
0	⩾100	none
1	75-99	slight
2	50-74	moderate
3	25-49	severe