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News Release

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Virus suppression effect of charged water particles(*1) has been verified by the virus clearance test(*2). – Effect on highly resistant virus and unknown viruses(*3) is expected. –

Panasonic Corporation conducted a virus clearance test and verified the suppression effect on viruses of nano-size charged water particles called "nanoe®" that were generated by applying a high voltage. The test was conducted in collaboration with Charles River Biopharmaceutical Services GmbH, which is a research laboratory that meets German GLP (Good Laboratory Practice).

Many viruses that are pathogenic to humans exist in nature. Even now, new viruses are being discovered. For example, HIV, the human immunodeficiency virus, and SARS corona virus(*4), the highly pathogenic avian flu virus, are still fresh in our memory. They have spread widely not only in Japan, but worldwide, and have become a major threat to human life.
In light of the high likelihood of new viruses being discovered and becoming widespread, we segmented the viruses by means of a virus clearance test based on segmentation criteria (presence of envelope(*5), genome(*6), and size). Four types of viruses that meet these criteria were segmented based on their physiochemical resistance (Xenotropic murine leukemia virus, Encephalomyocarditis virus, Pseudororabies virus, Pocrine parvovirus). We verified the suppression effect of "nanoe" charged water particles on these four types of viruses. The results suggest that a suppression effect can be expected for highly resistant and unknown viruses.

■Verification method

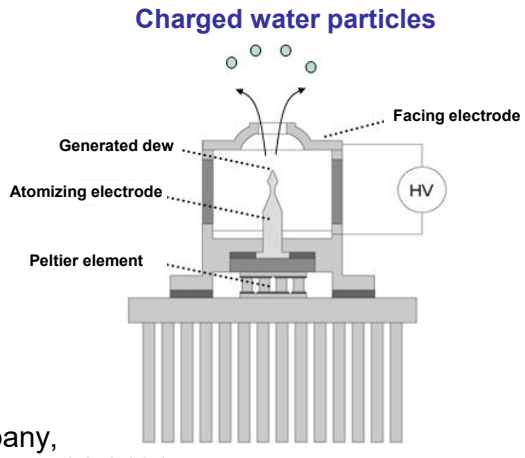
Four types of viruses were selected based on the virus clearance test (Guideline ICHQ5A, CPMP/BMP/269/95, Pharmaceutical Affairs Bureau #329), which is designed for pharmaceutical products. The GLP compliance comparison test was then conducted on these four types of viruses, comparing one group that was exposed to charged water particles and another group that was not.

■ Test results

It was confirmed that 99% of the virus infection value of the four types of virus was suppressed in six hours.

■ Principles of generating charged water particles

The atomizing electrode is cooled with Peltier elements. This condenses water out of the atmosphere. A high voltage is applied across the atomizing electrode and the facing electrode to generate "nanoe®" charged water particles of 5 to 20 nanometers (nm) in size.



*1: Nano-sized charged water particles generated by applying a high voltage to water.
*2: The test is designed to predict the suppression effect against highly resistant and unknown viruses by verifying the effect on the viruses, which were selected according to the guidelines.
*3: Viruses within the scope of the existing study and know-how
*4: Edited by Takada Kenzo, 2009, "Virology" (3rd edition), P69-73, Nankodo Co., Ltd.
*5: Films surround the virus particles. The presence or absence of these films is determined by the virus types.
*6: DNA and RNA. While DNA plays a role in accumulating and storing information within the nucleus, RNA is synthesized when necessary to temporarily process the DNA information.

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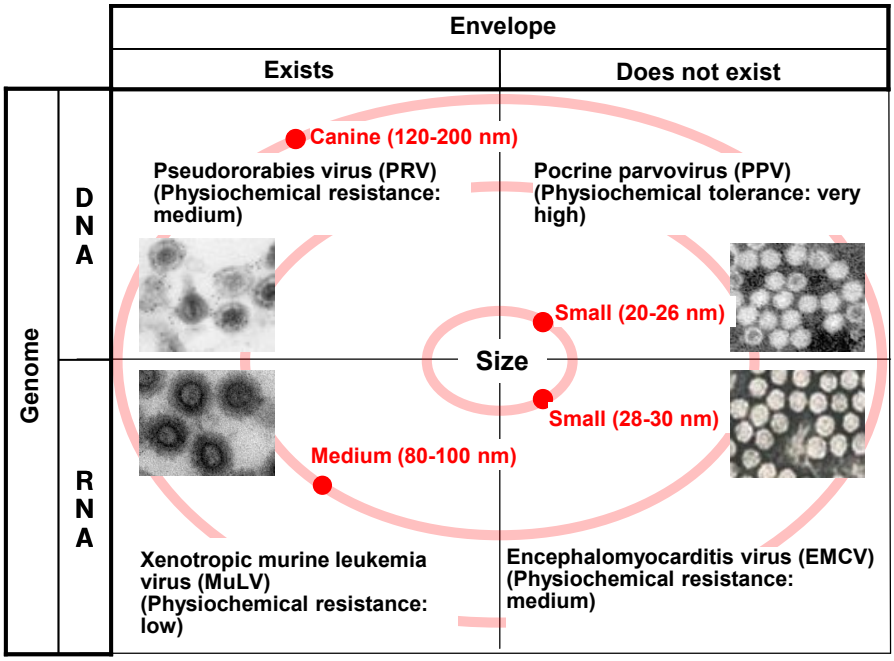
■ Verification data:

[Description of the test]

The GLP compliance comparison test was conducted on four types of viruses selected based on the virus clearance test (Guideline ICHQ5A, CPMP/BMP/269/95, Pharmaceutical Affairs Bureau #329), which is designed for pharmaceutical products. The viruses were placed into two groups, one that was exposed to charged water particles and one that was not.

- Test laboratory: Charles River Biopharmaceutical Services GmbH
- Test period: September to November 2011
- Test subject: Xenotropic murine leukemia virus, Encephalomyocarditis virus, Pseudororabies virus, Pocrine parvovirus (chart 1)
- Test method:
  - Test box volume: 45 liters
  - Exposure time: 3.6 hours
  - Exposure distance: 15 cm

Chart 1: Characteristics of viruses selected based on the "Virus Clearance Test Guideline"



[Results]

99% of the virus infection value of the four types of virus was suppressed in six hours.

Subject	Time (Hr)	Suppression rate (%)
Encephalomyocarditis virus	3	89.7
	6	99.98
Porcine parvovirus	3	80.5
	6	99.7
Xenotropic murine leukemia virus	3	77.6
	6	99.9998
Pseudororabies virus	3	99.4
	6	99.98

*Value converted by us

■ Perspective of Charles River Biopharmaceutical Services GmbH

The results indicate that "Nanoe" technology has the potential to inactivate human and animal derived viruses of broadly varying biophysics, overall and to a considerable degree. It is thought that the same holds true for highly resistant and unknown viruses.

■ Charles River Biopharmaceutical Services GmbH

The facility of the Charles River Laboratory Group, which is a global company, is entrusted with the breeding and supply of high quality laboratory animals and various safety tests for pharmaceutical product development, from he pre-clinical stage to the post-market stage.

- Location: Gottfried-Hargen Str.20, 51105 Cologne, Germany
- Service: Virus and TSE Clearance Test (GLP, Non-GLP)

<For your reference>

■ Verified effects of “nanoe” technology

Verified test items for “nanoe” charged water particles						
Test item		Results	Test conditions		Test request Test laboratory	Report No.
			Capacity volume (L)	Time (Hr)		
Deodorization	Tobbaco smell	Deodorized within 30 minutes	250	0.5	Panasonic Electric Works Analysis Center Co., Ltd.	E02-090313 MH-01
	Methyl mercaptan (odor of garbage)	Deodorized within 15 minutes	250	0.25	Panasonic Electric Works Analysis Center Co., Ltd.	E02-080219 MH-01
Bacteria suppression	Enterohemorrhagic Escherichia coli (O157)	Suppressed by 99.99% (*6)	45	1	Japan Food Research Laboratories	208120880 - 001 209010548 - 001
	Methicillin-resistant Staphylococcs aureus (MRSA)	Suppressed by 99.99% (*6)	45	1	Japan Food Research Laboratories	208120880 - 002 209010548 - 002
	Multidrug-resistant pseudomonas aeruginosa MDRF	Suppressed by 99% (*6)	45	2	Toho University Medical School School of Nursing Department of Infection Control and Prevention	
	Multi-drug-resistant acinetobacter bowmani MDRAB	Suppressed by 99% (*6)	45	2	Toho University Medical School School of Nursing Department of Infection Control and Prevention	
Mold suppression	Dermatophyte	Suppressed by 99.7% (*6)	40	24	Panasonic Electric Works Analysis Center Co., Ltd.	E02-061002 IN-01
Allergen suppression	Pollen	Suppressed by 99% (*6)	45	2	Panasonic Electric Works Analysis Center Co., Ltd.	E02-080303 IN-03
	Tick	Suppressed by 98% (*6)	45	2	Panasonic Electric Works Analysis Center Co., Ltd.	E02-080204 IN-02
Virus suppression	Bird flu viruses H5N1and H9N2 subtypes	Suppressed by 99.9% (*6)	45	4	Test laboratory: National University Corporation Obihiro University of Agriculture and Veterinary Medicine Research Center for Animal Hygiene and Veterinary Medicine	
	Canine distemper viruses	Suppressed by 98.2% (*6)	45	4	Test laboratory: School Corporation Rakuno Gakuen Rakuno Gakuen University	
	Influenza viruses H1n1 type	Suppressed by 99.9% (*6)	45	4	Japan Food Research Laboratories	208040534 - 001
	Feline calcivirus (related form of norovirus)	Suppressed by 99.9% (*6)	25	2	Japan Food Research Laboratories	207031493 - 001
Agricultural chemical reduction	Methamidophos	Reduced by 92.3% (*6)	45	4	Takara Bio Inc.	080920 080921
	Dichlorvos	Reduced by 77.1% (*6)	45	4	Takara Bio Inc.	080925 080926
	Chlorpyrifos	Reduced by 98.0% (*6)	45	4	Panasonic Electric Works Analysis Center Co., Ltd.	08BY397
	Diazinon	Reduced by 89.1% (*6)	45	4	Panasonic Electric Works Analysis Center Co., Ltd.	08BY397

*6 Value converted by us

[Method of evaluation]

- Deodorization: Sensory inspection based on the six-level odor intensity indication method (tobacco: -1.0, with a panel of 12 test subjects, and methyl mercaptan: -1.2, with a panel of eight test subjects)
- Bacterium, mold, and allergen suppression test: Gauzes saturated with the target substances were exposed to “nanoe” charged water particles for a pre-determined period and then evaluated.
- Virus (feline calcivirus) suppression test: Cloth saturated with viruses was exposed to “nanoe” charged water particles for a pre-determined period and then evaluated
- Virus (bird flu, canine distemper, or influenza virus) suppression test: “nanoe” charged water particles were directly applied and then evaluated.