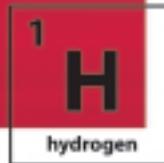
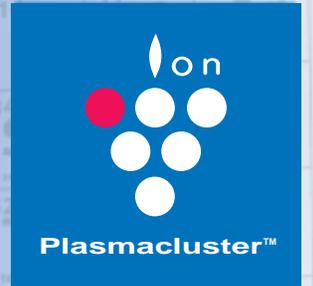


# ION

# H<sub>2</sub>O



2



## Plasmacluster Ion (PCI)

## Plasmacluster Ion (PCI) Sales Training

### Why Plasmacluster Ion (PCI)?

#### Airborne Contaminants

The air we breathe is full of various airborne particles. This includes everything from dust and pet dander, to viruses, bacteria, mold and fungi. Reducing the overall volume of airborne particles can dramatically reduce exposure to airborne triggers for allergy and asthma sufferers.

#### The Morning Allergy Attack

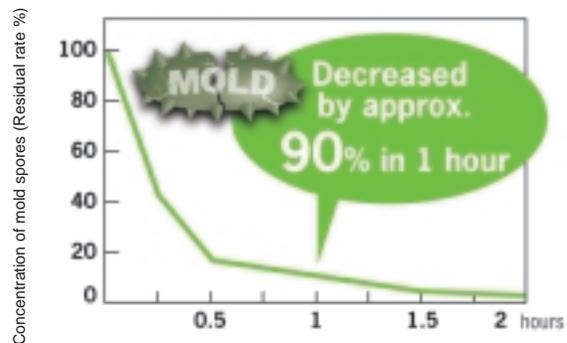
Even in apparently clean homes, people often experience allergy symptoms shortly after waking up. This is called a morning attack. During the course of the night, airborne particles settle on surfaces, including your bed and the floor. They lay undisturbed until you wake up, throw the covers off and walk across the floor. This instantly throws a heavy concentration of dust and other particles into the air causing many people to start sniffing and sneezing.

#### Plasmacluster Ion Technology Works to Keep Air Clean and Pure

The Plasmacluster Ions form into groups of positive and negative ions. They knock out airborne contaminants and decompose sources of annoying odors. Experiments conducted by a testing organization recognized by Japan's Ministry of Health, Labor and Welfare demonstrated that this technology has the power to reduce mold fungus by 90% in one hour. Air purification technology based on Plasmacluster Ions represents a revolutionary new system for cleaning the air totally unlike any existing techniques.

#### Over 90% Effectiveness in less than 1 hour

Inactivation Performance on Airborne Mold Spores  
(Test performed using an air purifier, FU-L40X, Japanese domestic model)



#### A Completely Natural Process



■ Mode of operation: Plasmacluster Ion generator single operation in an experimental room approximately 5.0 square meters. ■ Temperature inside the room: 25°C, Humidity: 42% RH. ■ Method of measurement: Air samples measuring the quantity of mold spores were taken from inside the room at a point approx. 1.3 m above the floor and 2.0m from the outlet. ■ Inactivation method: Without filter, generate Plasmacluster Ions in the air. ■ Test performed by the Ishikawa Prefecture Preventive Medicine Association in Japan.

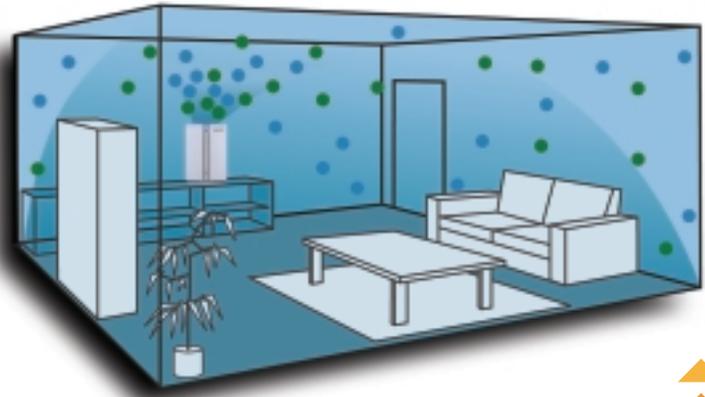


Why Plasmacluster Ion (PCI)? (contd.)

The World's 1st and only technology that actively **seeks out** and **inactivates** airborne bacteria, viruses, mold, fungi, smoke, pollen, dust mites and odour causing particles.

Positive and Negative Ions - The Fuel for Hydroxyl

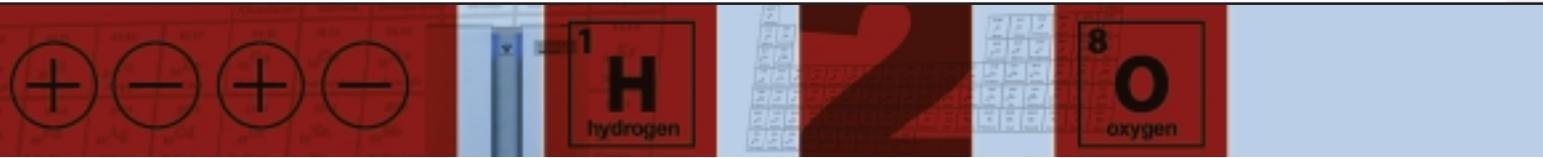
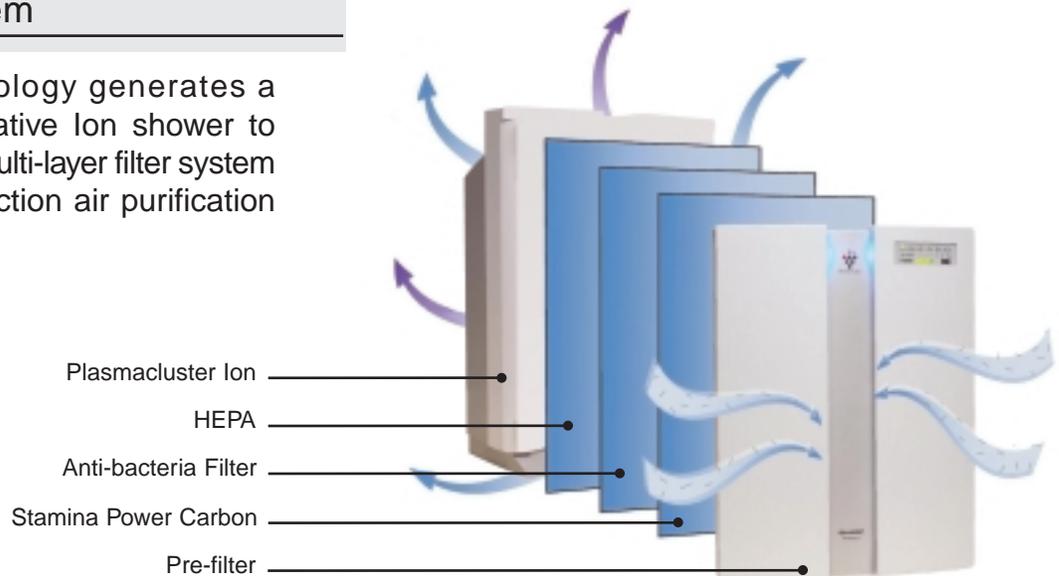
Countless studies have been conducted around the world with a focus on understanding the role of Hydroxyl in the cleaning of our atmosphere. Organizations such as NASA, The Canadian Space Agency, Oxford University, University of Toronto, Queen's University, University of Guelph and Environment Canada are all conducting ongoing studies. Hydroxyl is considered one of the most important atmospheric oxidants and has been nicknamed "Nature's Detergent".



+/- Ions are showered throughout the room

Multi-layer Filter System

Plasmacluster Ion Technology generates a balanced positive and negative Ion shower to purify the air. By coupling a multi-layer filter system with a HEPA filter, a dual action air purification system is created.



## What is Plasmacluster Ion (PCI) Technology?

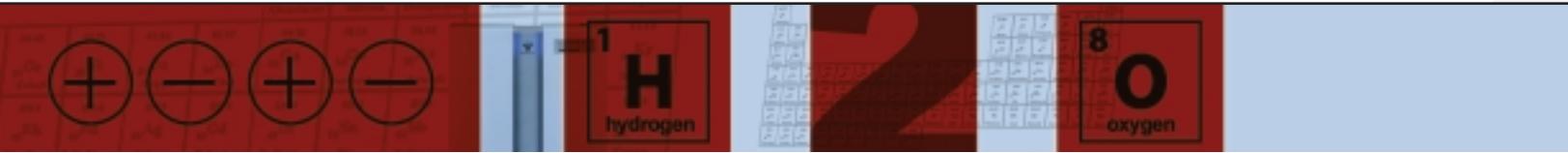
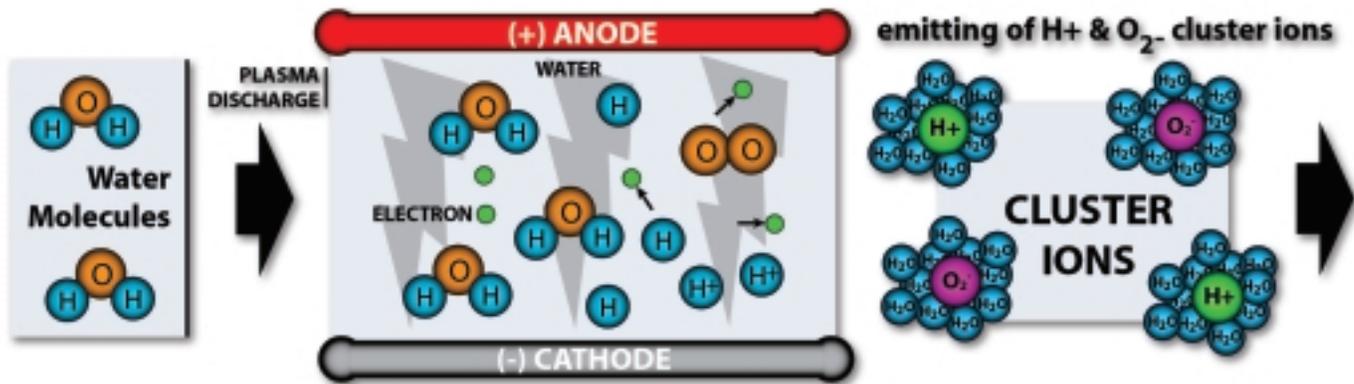
Plasmacluster Ion (PCI) technology is Sharp Electronics world-first technological breakthrough in air purification. By creating a positive and negative ion shower (PCI) we are able to recreate the natural chemical process that purifies the air in the Earth's troposphere. In this way, we are able to inactivate most airborne particles, including viruses, bacteria, mold spores, germs, fungi, and other odour causing and allergy triggering substances. It is even effective against many of the noxious components contained in cigarette smoke.

### Science 101

So let's get into the real science of it all. Plasmacluster Ion Technology is based on real science, and as a result works the way Mother Nature intended it to.

### Alternating plasma discharge

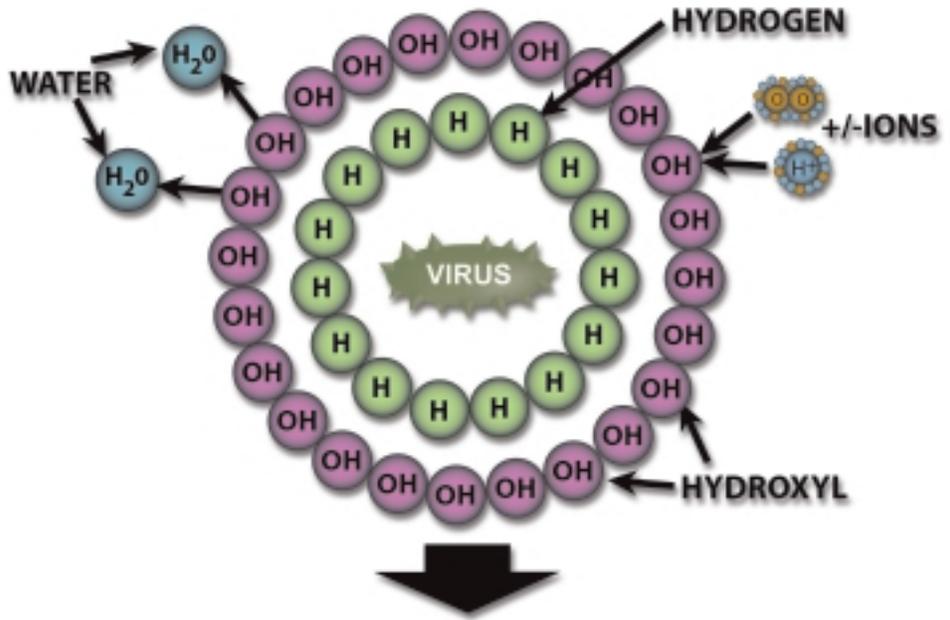
The Ion generator uses an alternating plasma discharge to split water molecules into oppositely charged hydrogen and oxygen ions.



## Science 101 (contd.)

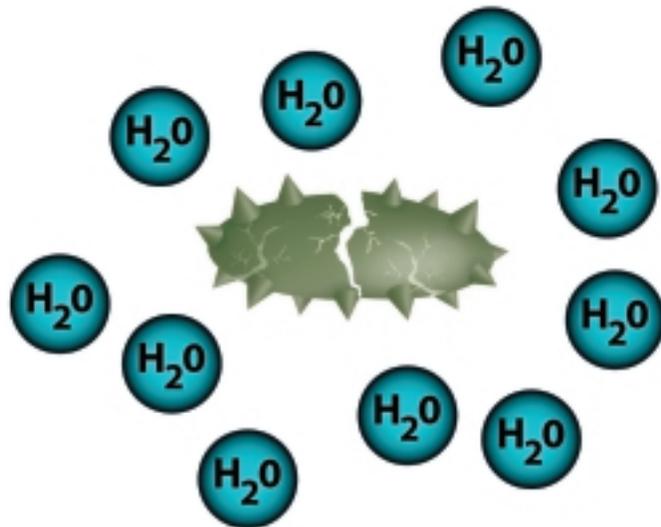
### The Ion Cluster's seek out, surround and inactivate airborne particles

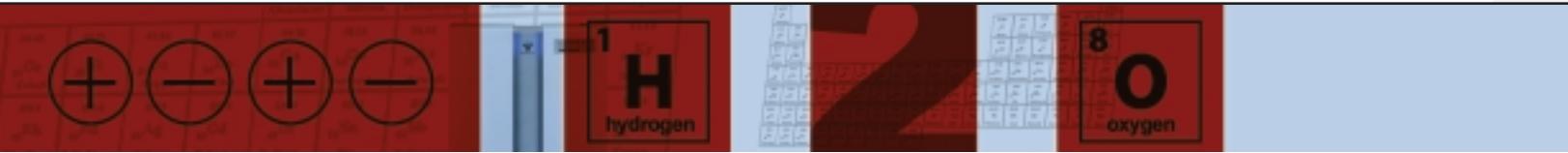
Cluster Ions are drawn to airborne particles by their electrical charge. The cluster then surrounds the particle. After this process the positive and negative ions react to form Hydroxyl (Nature's form of a Detergent), which robs the particles of the hydrogen necessary for them to survive.



### Hydroxyl eliminates hydrogen from the particle

After the Hydroxyl eliminates hydrogen from the particle, the PCI cleansing process is then complete making the airborne particle inactive.



## What is Plasmacluster Ion (PCI) Effective Against?

Dust



Bacteria & Viruses



House Dust Mite Allergens



Exhaust Fumes



Smoke



Washroom Odours



Garbage Odours



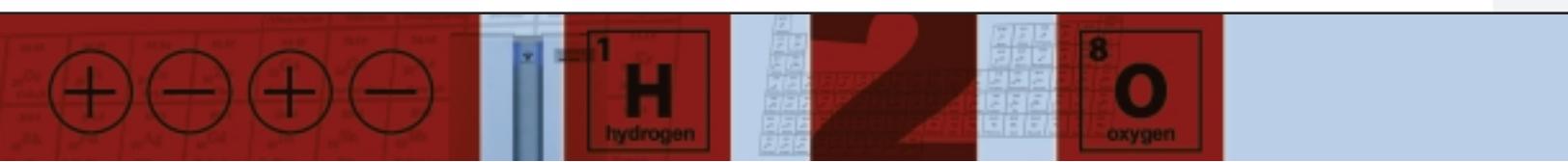
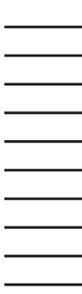
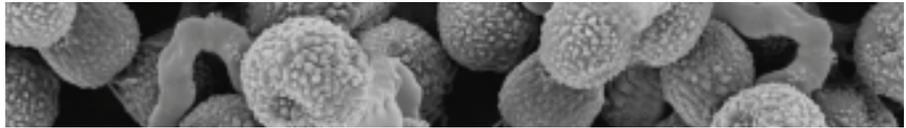
Pollen



Mold Spores & Germs

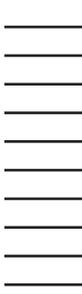
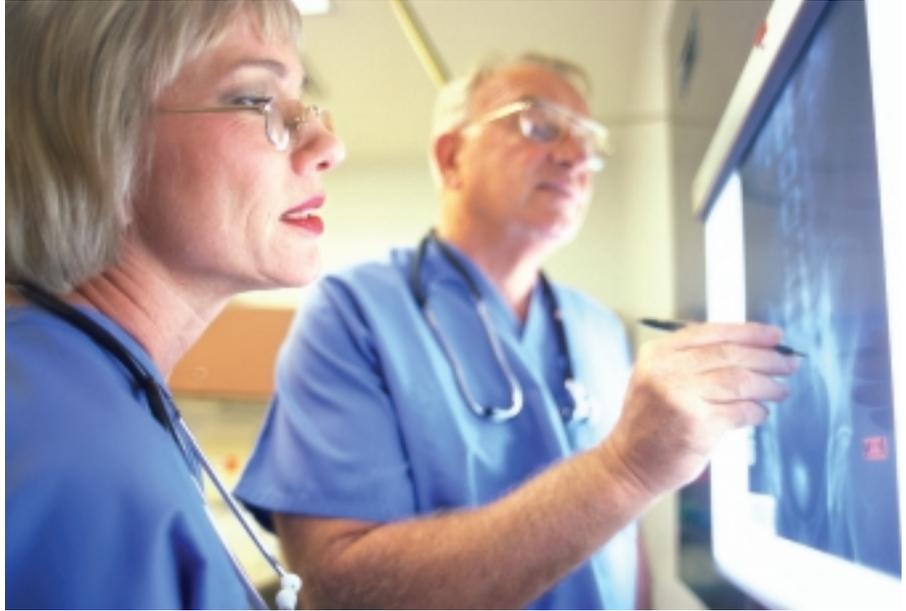


Pet Odours



Various Applications for Plasmacluster Ion (PCI) Air Purifiers

- Hospitals
- Home
- Offices
- Daycare Centres
- Schools
- Portables
- Medical Clinics
- Doctor/Dentist Offices
- Nursing Homes
- Kennels
- Animal Hospital
- Fitness Clubs
- RV/Campers
- Spas
- Hair Salons



## The Product Line

The FP-N60CX air purifier can effectively purify rooms up to 330 square feet. It is equipped with two air quality sensors that constantly monitor the environment of the room, allowing the unit to react to any changes (when in Auto mode). Unit comes with full-function remote control.



Air Purifying System:	Plasmacluster Ion Type/ Fan Type
Air Flow Fan Speed:	High 212m <sup>3</sup> /hr - Low 28m <sup>3</sup> /hr
CADR (Dust/Smoke/Pollen):	(209/213/205)
Filter:	Odour - HEPA Filter
	Dust - Activated Carbon Filter
	Anti-Bacteria - Apatite
Special Program Mode:	Pollen / Smoke
Sensor:	Odour Sensor & Dust Sensor
Off Timer:	1 / 4 / 8 hours
Recommended Area:	330 square feet
Remote Control:	Yes
Colour:	White
Outside Dimensions (mm):	415(W) x 572(H) x 238(D)
Weight:	9.0 kg

The FP-N40CX air purifier can effectively purify rooms up to 252 square feet. It is equipped with an air quality sensor that constantly monitors the environment of the room, allowing the unit to react to any changes (when in Auto mode). Unit comes with full-function remote control.



Air Purifying System:	Plasmacluster Ion Type/ Fan Type
Air Flow Fan Speed:	High 141m <sup>3</sup> /hr - Low 18m <sup>3</sup> /hr
CADR (Dust/Smoke/Pollen):	(157/163/156)
Filter:	Odour - HEPA Filter
	Dust - Activated Carbon Filter
	Anti-Bacteria - Apatite
Special Program Mode:	Pollen / Smoke
Sensor:	Odour Sensor
Off Timer:	1 / 4 / 8 hours
Recommended Area:	253 square feet
Remote Control:	Yes
Colour:	White
Outside Dimensions (mm):	415(W) x 572(H) x 197(D)
Weight:	7.0 kg



The Product Line (contd.)

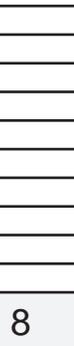
The FP-N25CX air purifier can effectively purify rooms up to 132 square feet. It is equipped with an air quality sensor that constantly monitors the environment of the room, allowing the unit to react to any changes (when in Auto mode). Unit comes with full-function remote control.



Air Purifying System:	Plasmacluster Ion Type/ Fan Type
Air Flow Fan Speed:	High 88m <sup>3</sup> /hr
CADR (Dust/Smoke/Pollen):	(86/85/88)
Filter:	Odour - HEPA Filter
	Dust - Activated Carbon Filter
	Anti-Bacteria - Apatite
Special Program Mode:	Pollen-Quick Auto
Sensor:	Odour Sensor
Off Timer:	1 / 4 / 8 hours
Recommended Area:	132 square feet
Remote Control:	Yes
Colour:	White
Outside Dimensions (mm):	420(W) x 420(H) x 150(D)
Weight:	4.4 kg



**Library Quiet™**



# Report on the Findings of Experiments Worldwide on the Suppression of Germ Propagation and on Germ Elimination by Plasmacluster Ions

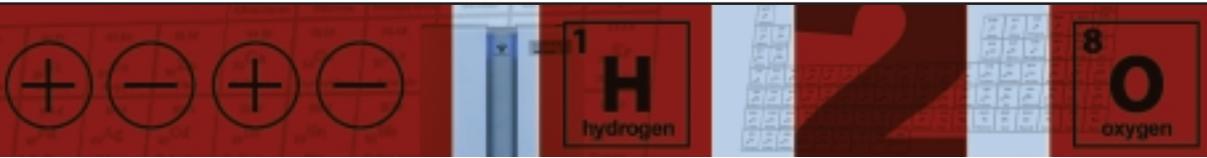
## Accredited Facilities Involved in Report Studies

### **Institute of Medical Microbiology and Hygiene of Lübeck University (Germany)**

The Medical University Lübeck (MUL) is characterized by top research and teaching at the interface of medicine, sciences and technology. MUL has a medical as well as a technical-scientific college and offers full-length courses in human medicine, informatics and molecular biotechnology. Concerning research the MUL places particular emphasis on the special research fields of the DFG (a German research association), the Molecular Mechanism of Inflammable and Degenerative Processes and Glycostructures in Biosystems - Description and Effect. In addition there is a clinical research group for neuroendocrinology which deals with current issues in hormone research. Also, the university participates in the planning of a science and technology centre for an intensive transfer between the university and young entrepreneurs.

### **Shanghai Preventive Municipal Center for Disease Prevention & Control (China)**

The Shanghai Municipal Center for Disease Prevention & Control is a city scientific research institution which aims to improve techniques for health and the development of applied research for preventive medicine. The Center mainly carries out applied research for the prevention of sickness along with identifying and assessing factors that hamper health such as the environment, work, or mainutrition. Additionally, the Center performs health examination measurements, sanitary assessments and inspections to measure microorganisms.



Accredited Facilities Involved in Report Studies (contd.)

**Ishikawa Prefecture Preventive Medicine Association (Japan)**\_\_\_\_\_

Established in October of 1952, the Association has actively developed preventive medicine activities through the entire Prefecture of Ishikawa with various physicals, examinations, and assessment. In 1999, the Association completed their Health Management Center, Cancer Check Center, and Preventive Medicine Clinic. Also, as a product test facility, the association performs tests on food and related items.

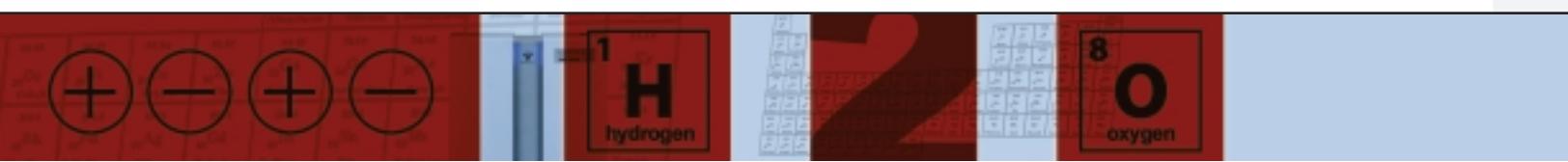
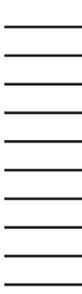
Other Accredited Facilities Involved



Department of Molecular Biotechnology of The Graduate School of Advanced Sciences of Matter at Hiroshima University in Japan

Kitasato Research Centre for Environmental Sciences in Japan

The British Allergy Foundation



# Report: Fungi - airborne fungi

Institute of Medical Microbiology and Hygiene of Lübeck University (Germany)

**Table 1**

Testing the action of the plasmacluster on the germinating capacity of **Penicillium expansum** spores according to the modified ASTM C 665 test.

**Cluster ion generator 1:** Plasmacluster unit (from Sharp)

**Initial concentration of the test germ:**  $7.8 \times 10^9$  CFU's/ml *Penicillium expansum* spores in physiological common salt solution +0.01% (w/w) Tween 80

**Test carrier material:** Beechwood spatula (roughened, 20% (w/w) material moisture content); 2x15 cm spatulas for the medical requirement

**Application volume:** 500 µl

**Test chamber:** Plastic box (22 x 20 x 15 cm)

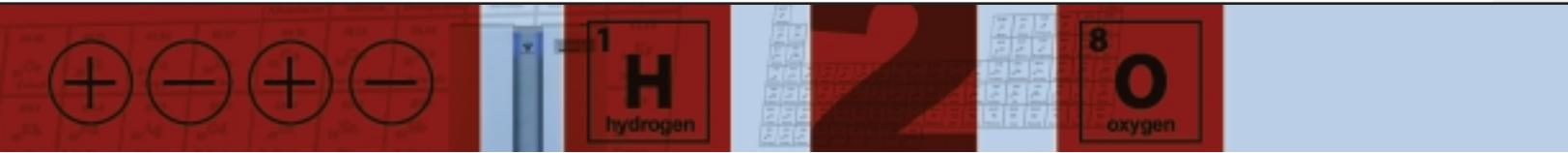
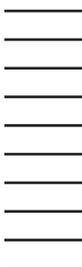
**Water reservoir:** 350 ml distilled water in plastic box (13 x 11 x 4 cm) with perforated screen cover

**Method of demonstration:** Surface contact sampling with Tesafilm, coloration with lactophenol blue, microscopic determination

Serial no.	Date	With plasmacluster action Microscopic determination of the growth phases						Without plasmacluster action Microscopic determination of the growth phases					
		1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup> spatula	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup> spatula
1	25.03.02	+	+	+	+	+	+	+	+	+	+	+	+
2	27.03.02	+	+	+	+	+	+	+	+	+	+	+	+
3	29.03.02	+	+	+	+	+	+	+	+	+	+	+	+
4	31.03.02*)	+	+	+	+	+	+	+	+	+	+	+	+
5	02.04.02	+	+	+	+	+	+	++++	+++	++	++++	++	++
6	06.04.02	+	+	+	+	++++	++++	++++	++++	++	++++	+++	++++
7	08.04.02	+	+	+	+	++++	++++	++++	++++	++++	++++	++++	++++

- Evaluation:
- + Spores only
  - ++ Germination (isolated hyphae)
  - +++ Hypha formation
  - ++++ Formation of fructifying organs (new spore chains)

\*) Plastic boxes each filled with 350ml of distilled water  
ASTM=American Society for Testing and Materials



Report: Fungi - airborne fungi (Contd.)

Institute of Medical Microbiology and Hygiene of Lübeck University (Germany)

**Table 2**

Testing the action of the plasmacluster on the germinating capacity of **Aspergillus fumigatus** spores according to the modified ASTM C 665 test.

**Cluster ion generator 1:** Plasmacluster unit (from Sharp)

**Initial concentration of the test germ:**  $1.7 \times 10^6$  CFU's/ml *Aspergillus fumigatus* spores in physiological common salt solution +0.01% (w/w) Tween 80

**Test carrier material:** Beechwood spatula (roughened, 20% (w/w) material moisture content); 2x15 cm spatulas for the medical requirement

**Application volume:** 500 µl

**Test chamber:** Plastic box (22 x 20 x 15 cm)

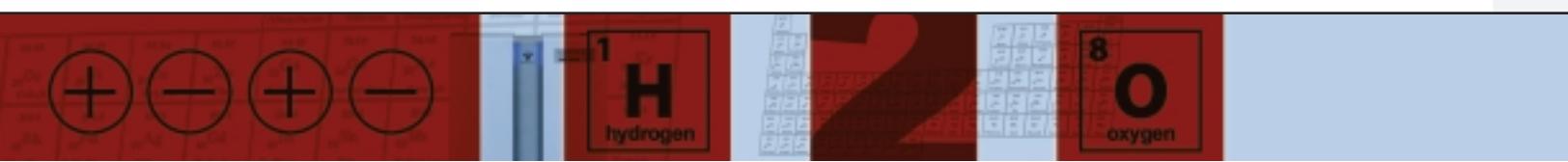
**Water reservoir:** 350 ml distilled water in plastic box (13 x 11 x 4 cm) with perforated screen cover

**Method of demonstration:** Surface contact sampling with Tesafilm, coloration with lactophenol blue, microscopic determination

Serial no.	Date	With plasmacluster action			Without plasmacluster action		
		Microscopic determination of the growth phases			Microscopic determination of the growth phases		
1	10.04.02	+	+	+	+	+	+
2	12.04.02	+	+	+	++	++	++
3	15.04.02	+	+	+	+++	++++	+++
4	17.04.02	+	+	+	++++	++++	++++
5	19.04.02	+	++	++	++++	++++	++++

Evaluation: + Spores only  
 ++ Germination (isolated hyphae)  
 +++ Hypha formation  
 ++++ Formation of fructifying organs (new spore chains)

\*) Plastic boxes each filled with 350ml of distilled water  
 ASTM=American Society for Testing and Materials



Report: Fungi - airborne fungi (Contd.)

Institute of Medical Microbiology and Hygiene of Lübeck University (Germany)

**Table 3**

Testing the action of the plasmacluster on the germinating capacity of **Cladosporium herbarum** spores according to the modified ASTM C 665 test.

**Cluster ion generator 1:** Plasmacluster unit (from Sharp)

**Initial concentration of the test germ:**  $4.4 \times 10^6$  CFU's/ml *Aspergillus fumigatus* spores in physiological common salt solution +0.01% (w/w) Tween 80

**Test carrier material:** Beechwood spatula (roughened, 20% (w/w) material moisture content); 2x15 cm spatulas for the medical requirement

**Application volume:** 500 µl

**Test chamber:** Plastic box (22 x 20 x 15 cm)

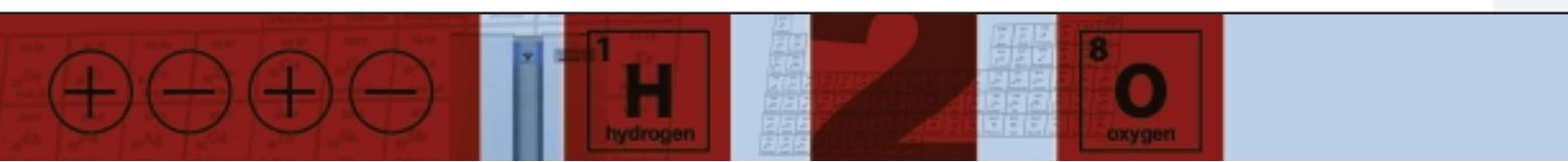
**Water reservoir:** 350 ml distilled water in plastic box (13 x 11 x 4 cm) with perforated screen cover

**Method of demonstration:** Surface contact sampling with Tesafilm, coloration with lactophenol blue, microscopic determination

Serial no.	Date	With plasmacluster action			Without plasmacluster action		
		Microscopic determination of the growth phases			Microscopic determination of the growth phases		
1	10.04.02	+	+	+	+	+	+
2	12.04.02	+	+	+	++	++	++
3	15.04.02	+	+	+	+++	++++	++++
4	17.04.02	+++	++	++++	++++	++++	++++
5	19.04.02	+++	++	++++	++++	++++	++++

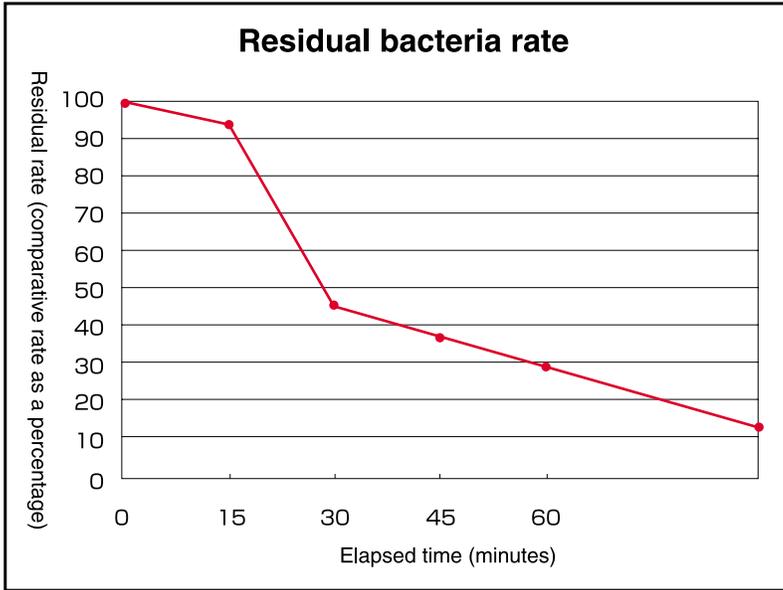
Evaluation: + Spores only  
 ++ Germination (isolated hyphae)  
 +++ Hypha formation  
 ++++ Formation of fructifying organs (new spore chains)

\*) Plastic boxes each filled with 350ml of distilled water  
 ASTM=American Society for Testing and Materials



Report: Fungi - airborne fungi (Contd.)

Ishikawa Prefecture Preventive Medicine Association (Japan)



**Test method**

**Control test**

Test room air space: Roughly equivalent to a 3 tatami-mat room

Test equipment air capacity: Forced air flow

Filter: None

Cluster: Stopped

**Operating test**

Test room air space: Roughly equivalent to a 3 tatami-mat room

Test equipment air capacity: Forced air flow

Filter: None

Cluster: Operating

**Experiment method**

E.coli bacteria were dispersed into the control test room; the test equipment was turned on and the suspended bacteria count was measured for each duration of elapsed time using an air sampler. The air samplers of Biotest, Hyton and RCS were used, and samples were collected for 4 minutes at 40 litres per minute followed by culturing colonies and counting their number.

**Report: Airborne Influenza**

Kitasato Research Center of Environmental Sciences in Japan

**Inactivation Performance on Airborne Influenza**

Results of one pass test. Actual inactivation rate may differ according to room conditions and the model in use



■ Test method: One pass test, where a Plasmacluster Ion generator is placed in a cylindrical chamber (diameter: 5.5 cm, length: 20 cm) through which airborne influenza (approx. 2,000 pts per 300 L of air) are passed at the speed of approx. 4 m/sec and the inactivation rate is measured. This is then compared with the residual rate of influenza detected in the chamber without a Plasmacluster Ion generator in place. ■ Tested viruses: Natural airborne influenza. ■ Inactivation method: Generate Plasmacluster Ions (200,000/cm<sup>3</sup>) in the chamber. ■ Test performed by the Kitasato Research Center of Environmental Sciences in Japan.



**Report: Fungi - moldy fungi**

SHARP Corporation

**Sharp Experiment Results**

Plasmacluster Ions: **ON**

1 day



10 days



13 days



Plasmacluster Ions: **OFF**

1 day



10 days



13 days



Sharp's verification test using a sealed acrylic box



## Report: Bacteria - airborne colon bacilli

Institute of Medical Microbiology and Hygiene of Lübeck University (Germany)

**Table 4**

Testing the action of the bacteriostatic and bactericidal action of the plasmacluster on the reproduction of selected bacteria.

**Cluster ion generator 1:** Plasmacluster unit (from Sharp)

**Initial concentration of the test germ:** 9.68 x 10<sup>9</sup> CFU's/ml *Pseudomonas aeruginosa* in physiological common salt solution.  
 (24-hr cultures in both) 9.97 x 10<sup>9</sup> CFU's/ml *Enterococcus faecium* in physiological common salt solution.  
 3.87 x 10<sup>9</sup> CFU's/ml *Staphylococcus epidermidis* in physiological common salt solution.

**Solid nutrient:** CASO agar

**Application volume:** 100 µl of the 1:10<sup>6</sup> dilutions

**Test chamber:** Plastic box (22 x 20 x 15 cm)

**Water reservoir:** 350 ml distilled water in plastic box (13 x 11 x 4 cm) with perforated screen cover

**Method of demonstration:** Quantitative culture methods

Serial no.	Method of treatment	Treatment time	Microorganisms	Incubation time	Incubation temperature	Germ count in CFU'S/plate
1	With plasmacluster	12 hrs	<i>Pseudomonas aeruginosa</i>	5 hrs	37°C	794
	Without plasmacluster	0 hrs	ATCC 15442	5 hrs	37°C	968
2	With plasmacluster	12 hrs	<i>Enterococcus faecium</i>	12 hrs	37°C	1
	Without plasmacluster	0 hrs	ATCC 6057	12 hrs	37°C	997
3	With plasmacluster	12 hrs	<i>Staphylococcus epidermidis</i>	12 hrs	37°C	1
	Without plasmacluster	0 hrs	ATCC 12228	12 hrs	37°C	387

Evaluation: + Spores only  
 ++ Germination (isolated hyphae)  
 +++ Hypha formation  
 ++++ Formation of fructifying organs (new spore chains)

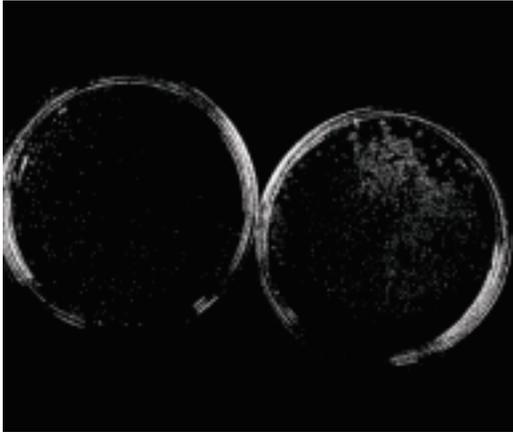
\*) Plastic boxes each filled with 350ml of distilled water  
 ASTM=American Society for Testing and Materials

Institute of Medical Microbiology and Hygiene of Lübeck University  
 Ratzenburger Allee 160, 23538 Lübeck



Report: Bacteria - airborne colon bacilli (contd.)

Institute of Medical Microbiology and Hygiene of Lübeck University (Germany)



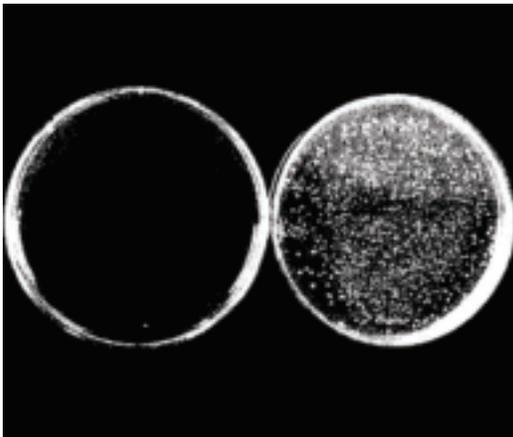
**Fig. 1**

Macroscopic photographs of the bacteriostatic action of the plasmacluster (from Sharp) on the reproducibility of *Pseudomonas aeruginosa* (ATCC 15442).

**l: With plasmacluster action (12hrs):** 794 CFU's/plate

**r: Without plasmacluster action:** 968 CFU's/plate

**Incubation tie/temperature:** 5hr/37° C



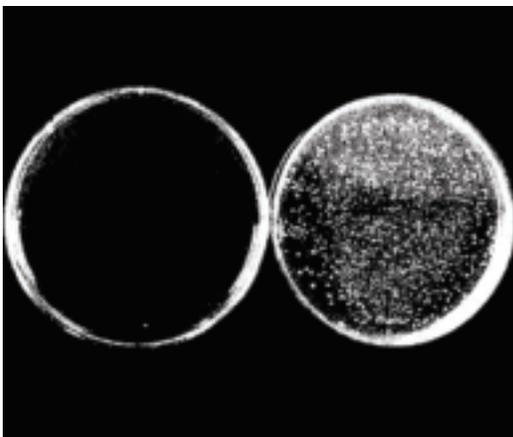
**Fig. 2**

Macroscopic photographs of the bacteriostatic action of the plasmacluster (from Sharp) on the reproducibility of *Enterococcus faecium* (ATCC 5057).

**l: With plasmacluster action (12hrs):** 1 CFU's/plate

**r: Without plasmacluster action:** 997 CFU's/plate

**Incubation tie/temperature:** 12hr/37° C



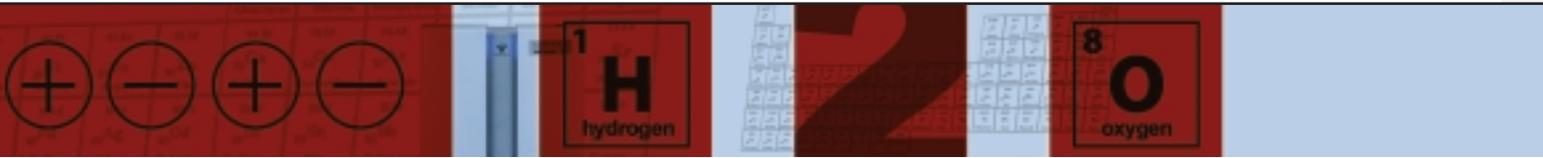
**Fig. 3**

Macroscopic photographs of the bacteriostatic action of the plasmacluster (from Sharp) on the reproducibility of *Staphylococcus epidermidis* (ATCC 12228).

**l: With plasmacluster action (12hrs):** 1 CFU's/plate

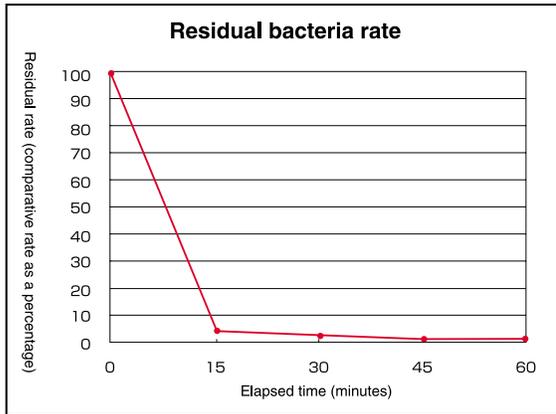
**r: Without plasmacluster action:** 387 CFU's/plate

**Incubation tie/temperature:** 12hr/37° C



Report: Colon basillus - airborne colon bacilli (contd.)

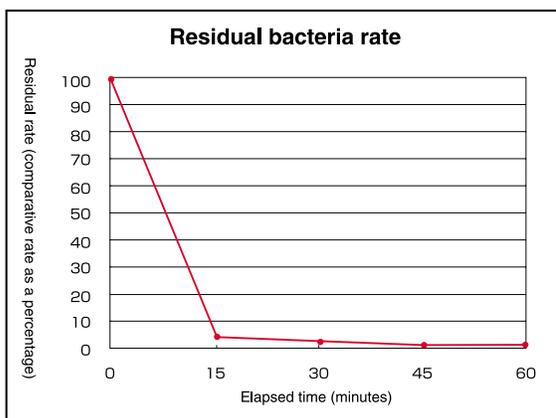
Shanghai Preventive Municipal Center for Disease Prevention & Control (China)



- 1. Test compliance:** Department of Sanitation, “Sterilization Technique Standards”, 3rd edition, volume one: Experiment technique standards. Air sterilization effect test technique.
- 2. Test temerature:** 22°C; Relative humidity:60%
- 3. Bacteria atomizing pressure:** 0.2 Mpa; Atomizing time: 5 minutes
- 4. Test method:** The tests were performed in two 15m<sup>3</sup> vaporization rooms, separated into one for the test group, and the other for the contrast group. During the test, compressed air at a pressure of 0.2Mpa was used to vaporize the rooms for 5 minutes. The concentration of bacteria in the room air was from 5 x 10<sup>4</sup> to 5

x10<sup>5</sup> cfu/m<sup>3</sup>. After vaporizing, the air in each room was first circulated and then 5 minutes after stopping, an air sampler was used to separately sample the test group and contrast group for initial values. Sampling was performed at a height of 1m for 1 minute with a flow rate of 28.3 litres/minute. Then the Plasmacluster generating devices were turned on and operated at intervals of 15, 30, 45 and 60 minutes. The vaporization room for the test group and the room for the contrast group were sampled according to method described above. The samples were cultivated at 87°C for 48 hours, the number of bacteria cultures measured, and the natural rate of decrease as well as the death rate were calculated.

Shanghai Preventive Municipal Center for Disease Prevention & Control (China)



**Test method**

**Control test**

Test room air space: Roughly equivalent to a 3 tatami-mat room  
 Test equipment air capacity: Forced air flow  
 Filtre: None  
 Cluster: Stopped

**Operating test**

Test room air space: Roughly equivalent to a 3 tatami-mat room  
 Test equipment air capacity: Forced air flow  
 Filtre: None  
 Cluster: Operating

**Experiment method**

E.coli bacteria were dispersed into the control test room; the test equipement was turned on and the suspended bacteria count was measured for each duration of elapsed time using an air sampler. The air samplers of Biotest, Hyton and RCS were used, and samples were collected for 4 minutes at 40 litres per minute followed by culturing colonies and counting their number.



Report: Colon basillus - moldy colon bacilli

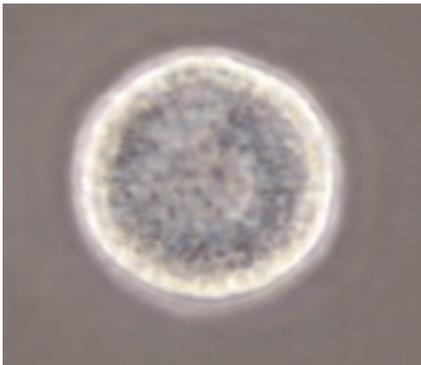
Shanghai Preventive Municipal Center for Disease Prevention & Control (China)

Plasmacluster results in the sterilization of bacteria from physical surfaces. Plasmacluster generating devices (each with a plasma ion production rate 50,000 ions/cm<sup>3</sup>) were placed in a test box with the dimensions 300mm x 150mm x 150mm. The average rate of the E.coli having died was 92.20% on a glass surface which had E. coli artificially added.

**Report: House Dust Mite Allergen**

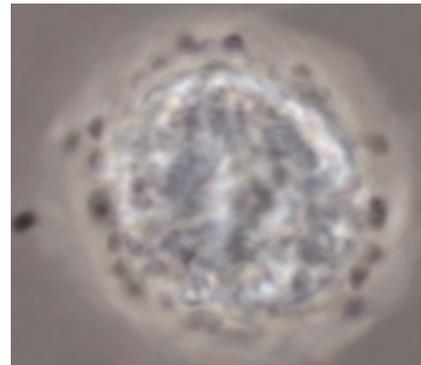
Graduate School of Advanced Sciences of Matter at Hiroshima University (Japan)

A recent study conducted by the Graduate School of Advanced Sciences of Matter at Hiroshima University revealed that Plasmacluster Ions deactivate airborne dust mite allergens, a main cause of asthma and atopic disorders.



With Plasmacluster Ions™

No allergic reaction, no release of irritant substance



Without Plasmacluster Ions™

Allergic reaction present, irritant substance that causes coughs, sneezes and snivels is released

