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News Release

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FOR IMMEDIATE RELEASE

Joint Research with Osaka City University Medical School Validates Inhibitory Effects of Sharp's High-Density Plasmacluster Ions*[1] on Allergic Reactions

Through joint research with the Osaka City University Medical School's Department of Biochemistry & Molecular Pathology, Sharp Corporation has validated that high-density Plasmacluster Ions are remarkably effective in inhibiting the binding of airborne mite allergens (dust containing dead mites and mite feces) and IgE antibodies[*2] derived from mite-sensitized mice. In other words, this achievement is a biological-level demonstration of the capability of high-density Plasmacluster Ions to remove airborne mite allergens[*3].

The joint research demonstrated that Plasmacluster Ions generated at a rate of 50,000 ions per cm^3 for 15 minutes in a space (with a volume of 1 m^3) where mite allergens have been kept airborne, successfully inhibited the binding of sampled mite allergens and IgE antibodies derived from the antiserum of mite-sensitized mice by approximately 97%. In addition, Plasmacluster Ions generated at a rate of approximately 25,000 ions per cm^3 were also confirmed to be capable of inhibiting antigen-antibody reactions by approximately 84%, indicating that the higher the density of Plasmacluster Ions, the more effective they are in inhibiting reactions.

These results suggest the potential of high-density Plasmacluster Ions to alleviate allergic symptoms.

Sharp Corporation will jointly announce the validations with Osaka City University Medical School at the 59th Annual Meeting of the Japanese Society of Allergology to be held in Japan from October 29.

Sharp's collaborative research with academic and research organizations around the world began in 2000 and has since proven that Plasmacluster Ions are effective in removing 28 kinds of harmful airborne microorganisms, including MRSA[*4]. The research has also confirmed the safety of high-density Plasmacluster Ions with respect to human health[*5].

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Sharp intends to further its efforts for improving the effectiveness of Plasmacluster Ion technology and to pass those benefits on to society.

From the observations of Prof. Masayasu Inoue, Osaka City University Medical School

The Japanese Ministry of Health, Labour and Welfare reports that one of every three Japanese citizens has allergic symptoms.

Sharp research has demonstrated the potential of Plasmacluster Ion technology to alleviate allergic symptoms.

Typical actions taken to combat allergies include diligent cleaning with active ventilation and, in the field of medicine, prescribing drugs (antihistamines or steroids), or the use of high-performance face masks. Plasmacluster Ion technology is on a par with these conventional measures, and offers a promising new technique to help tackle the problem of allergies.

*1 Plasmacluster and Plasmacluster Ion are the trademarks of Sharp Corporation.
*2 Proteins that combine with allergens and cause allergic reactions.
*3 Allergenic substances contained in dead dust mites or dust mite feces.
*4 MRSA is an acronym for methicillin-resistant *Staphylococcus aureus*, a bacterium responsible for difficult-to-treat infections in humans. MRSA typically infects humans with weakened immune systems, such as patients in hospitals, and its resistance to a large group of antibiotics is a serious problem.
*5 Testing conducted by Mitsubishi Chemical Medience Corporation (inhalation toxicity as well as eye and skin irritation/corrosion tests).

Method for Proving Effectiveness in Removing Airborne Mite Allergens and the Results

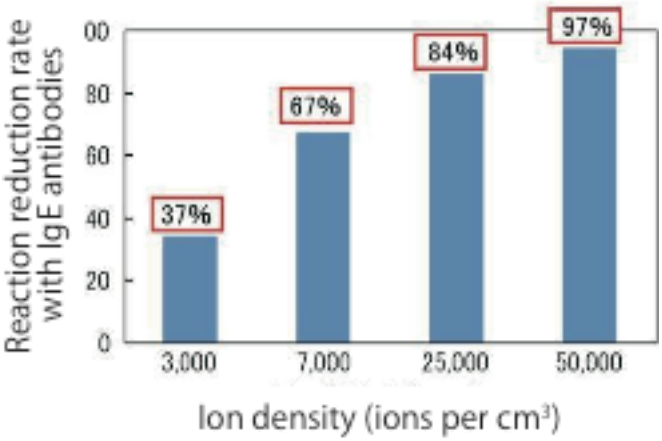
<Proving Effectiveness>

- Prepare two boxes, each having a volume of 1 m^3. Place a high-density Plasmacluster Ion generator unit in one box.
- Spray mite dust (dust containing dead mites and mite feces) into both boxes. After 15 minutes, sample airborne dust mites from both boxes.
- Draw IgE antibodies from the antiserum of two mice that have been made allergic to dust mites over several weeks.
- Apply the IgE antibodies from the two mice to dust mites sampled from the two boxes.

<Results Figure 1>

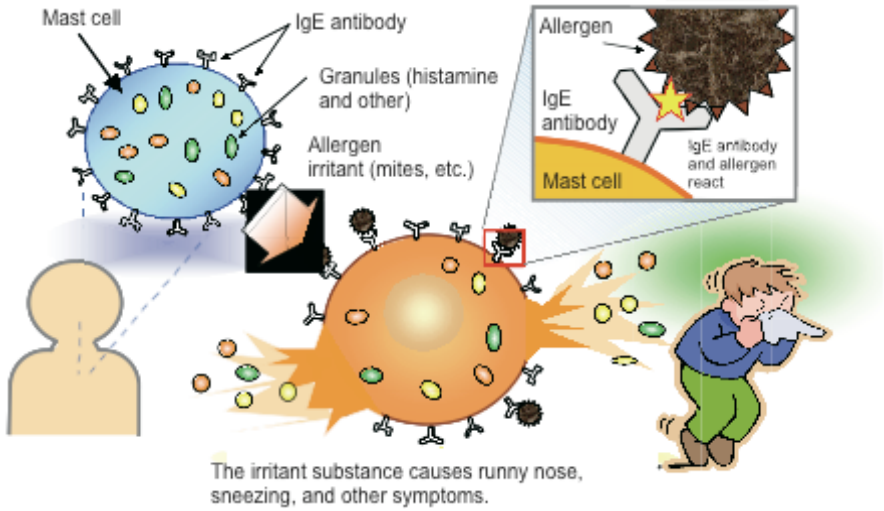
Based on the premise that when no Plasmacluster Ions are present, the rate of reaction between the allergen and the IgE antibodies would be 100%, it was found that the presence of Plasmacluster Ions generated for 15 minutes at a rate of 50,000 ions per cm^3 successfully inhibited the occurrence of allergic reactions by 96.6%. In addition, it was confirmed that high-density Plasmacluster Ions generated at a rate of approximately 25,000 ions per cm^3 inhibited allergic reactions by approximately 84%, and those generated at a rate of 7,000 ions per cm^3 inhibited allergic reactions by 67%. This indicates that the higher the density of Plasmacluster Ions, the more effective they are in inhibiting allergic reactions.

Figure 1



How Allergies Occur

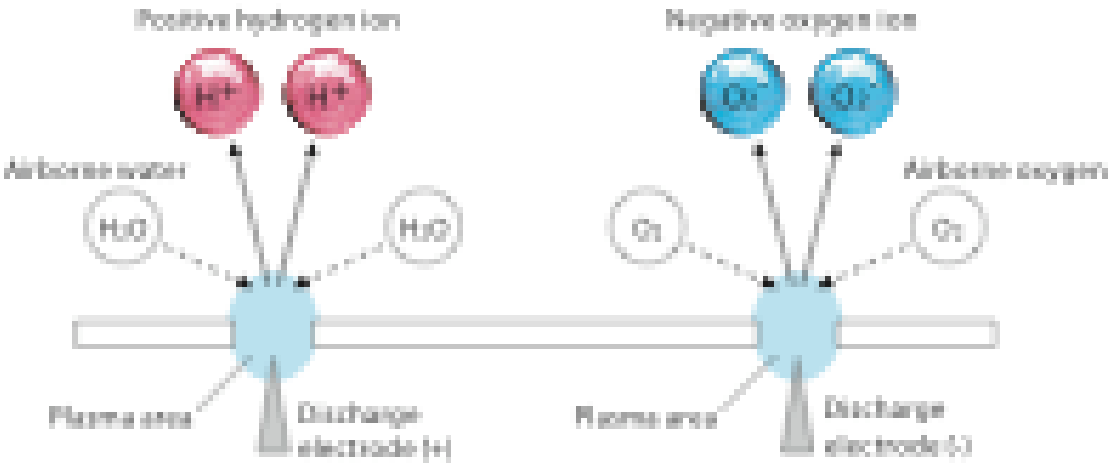
When an allergen first enters the human body, the body creates IgE antibodies, which combine with mast cells. Newly entering allergens bind with the combined IgE antibodies, causing the mast cells to release irritant substances such as histamine. The histamine irritates tissues such as the mucosa of the throat and nose, evoking an allergic reaction with syptoms such as coughing, sneezing, and runny nose.



Explanation of Terms	
Allergen (antigen)	A foreign substance, such as mite dust, pollen, fungi, etc., that causes an allergic reaction.
IgE antibody	Immunoglobulin E antibody; binds to foreign substances (antigens) and causes allergic reactions.
Mast cell	A cell in mucosal surfaces and tissue that produces irritant substances such as histamine. A mast cell has a diameter of 10 to 30 µm. IgE antibodies adhere to its cell surface. When allergens combine with the IgE antibodies, the mast cell releases irritant substances such as histamine that cause an allergic reaction.

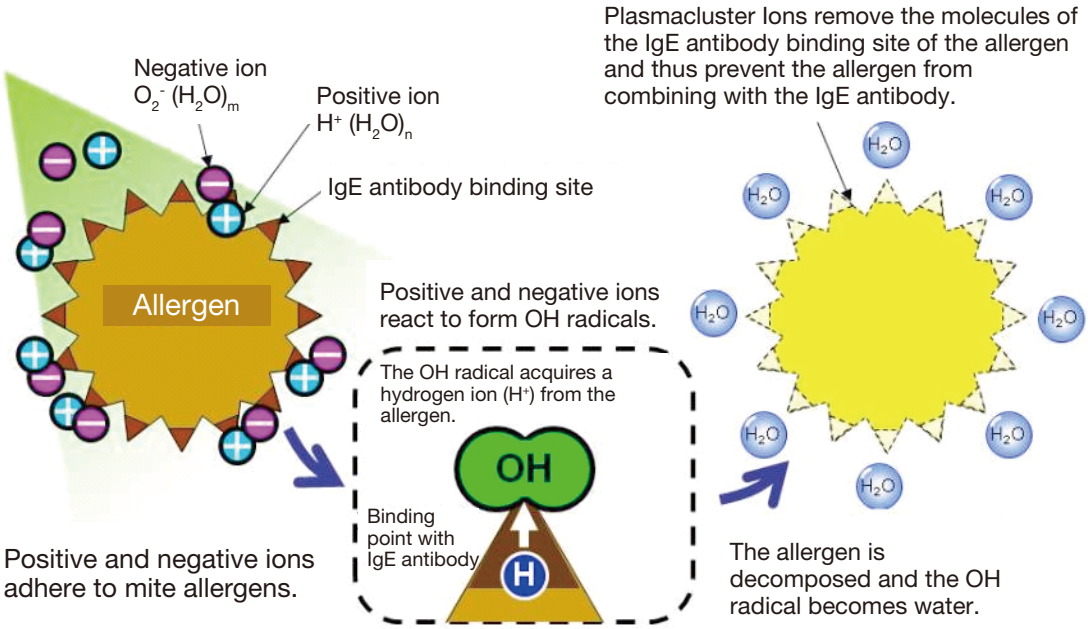
How Plasmacluster Ions Are Generated

Applying positive and negatively charged voltages to discharge electrodes electrically decomposes water molecules in the air into hydrogen molecules and oxygen molecules. Positive hydrogen ions (H^+) and negative oxygen ions (O_2^-) are generated in this way.



Mechanism of Plasmacluster Ion Allergen Removal

As Plasmacluster Ions surround airborne allergens, they are transformed into OH (hydroxyl) radicals, a powerful activated substance. When an OH radical acquires a hydrogen ion (H^+) from the protein on the surface of the allergens (combined IgE antibody), the proteins are decomposed and denatured at the molecular level. Thus, even if these allergens were to enter the body, the body would not react with allergic symptoms.



Profile of Prof. Masayasu Inoue, Osaka City University Medical School

Professor, M.D., Department of Biochemistry & Molecular Pathology, Osaka City University Medical School.

[Specialty] Reactive oxygen species, molecular pathology

[Professional career]

1983 – 1992: Associate Professor, Kumamoto University Medical School (Biochemistry)
1989 – present: Visiting Professor, Tufts University Medical School (Molecular Physiology)
1992 – present: Professor, Osaka City University Medical School (Biochemistry)
2000 – present: Vice President, Biomedical Research Institute, Kurashiki Medical Center

[Activities]

Member, Japanese Society of Biochemistry
Member, Japanese Society of Inflammation
Member, Japanese Society of Hepatology
Member, Japan Society of Molecular Medicine
Member, Japan Society of Drug Delivery System
Member, Society for Free Radical Research (Asian Representative)
Member, New York Academy of Science

Efficacy of Plasmacluster Ions Against Various Pathogens Confirmed Through Collaborative Research

Target Substance	Species	Testing & Verification Organization	Date of Announcement
Bacteria	*Serratia* bacteria	Harvard School of Public Health (Dr. Melvin W. First, Professor Emeritus), United States	March 2007
	Coliform bacteria (*E. coli*)	Ishikawa Health Service Association, Japan	September 2000
	E. coli, *Staphylococcus* (*aureus*), Candida	Shanghai Municipal Center for Disease Control and Prevention, China	October 2001
	Bacillus subtilis	Kitasato Research Center of Environmental Sciences, Japan	September 2002
		CT&T (Professor Gerhard Artmann, Aachen University of Applied Sciences), Germany	November, 2004
	MRSA (methicillin-resistant *Staphylococcus aureus*)	Kitasato Research Center of Environmental Sciences, Japan	September 2002
		Kitasato Institute Medical Center Hospital, Japan	February 2004
	Pseudomonas, Enterococcus, Staphylococcus	University of Lübeck, Germany	February 2002
	Enterococcus, Staphylococcus, Sarcina, Micrococcus	CT&T (Professor Gerhard Artmann, Aachen University of Applied Sciences), Germany	November 2004
Allergens	Mite allergens, pollen	Graduate School of Advanced Sciences of Matter, Hiroshima University, Japan	September 2003
	Mite allergens	Osaka City University Medical School	July 2009
Fungi	Cladosporium	Ishikawa Health Service Association, Japan	September 2000
		University of Lübeck, Germany (growth-suppressing effect)	February 2002
		CT&T (Professor Gerhard Artmann, Aachen University of Applied Sciences), Germany	November 2004

	Penicillium, Aspergillus	University of Lübeck, Germany (growth-suppressing effect)	February 2002
	Aspergillus, Penicillium (two species), Stachybotrys, Alternaria, Mucorales	CT&T (Professor Gerhard Artmann, Aachen University of Applied Sciences), Germany	November 2004
Viruses	H1N1 human influenza virus	Kitasato Research Center of Environmental Sciences, Japan	September 2002
		Seoul University, Korea	September 2003
		Shanghai Municipal Center for Disease Control and Prevention, China	December 2003
		Kitasato Institute Medical Center Hospital, Japan	February 2004
	H5N1 avian influenza virus	Retroscreen Virology, Ltd., London, UK	May 2005 August 2008
	Coxsackie virus	Kitasato Research Center of Environmental Sciences, Japan	September 2002
	Polio virus	Kitasato Research Center of Environmental Sciences, Japan	September 2002
	Corona virus	Kitasato Institute Medical Center Hospital, Japan	July 2004

Note: Efficacy in inhibiting activity of the airborne target substances noted above was verified by exposing the substances to an ion concentration of at least 3,000 ions/cm^3.