

The background of the slide features a soft-focus, artistic photograph of sand dunes. The dunes are in the foreground, with their crests and ridges gently rolling across the frame. Above the dunes, the air is filled with numerous small, white, out-of-focus particles that appear to be floating or drifting, creating a dreamlike and ethereal atmosphere. The overall color palette is muted, consisting of soft blues, greys, and the natural tan of the sand.

The World's First

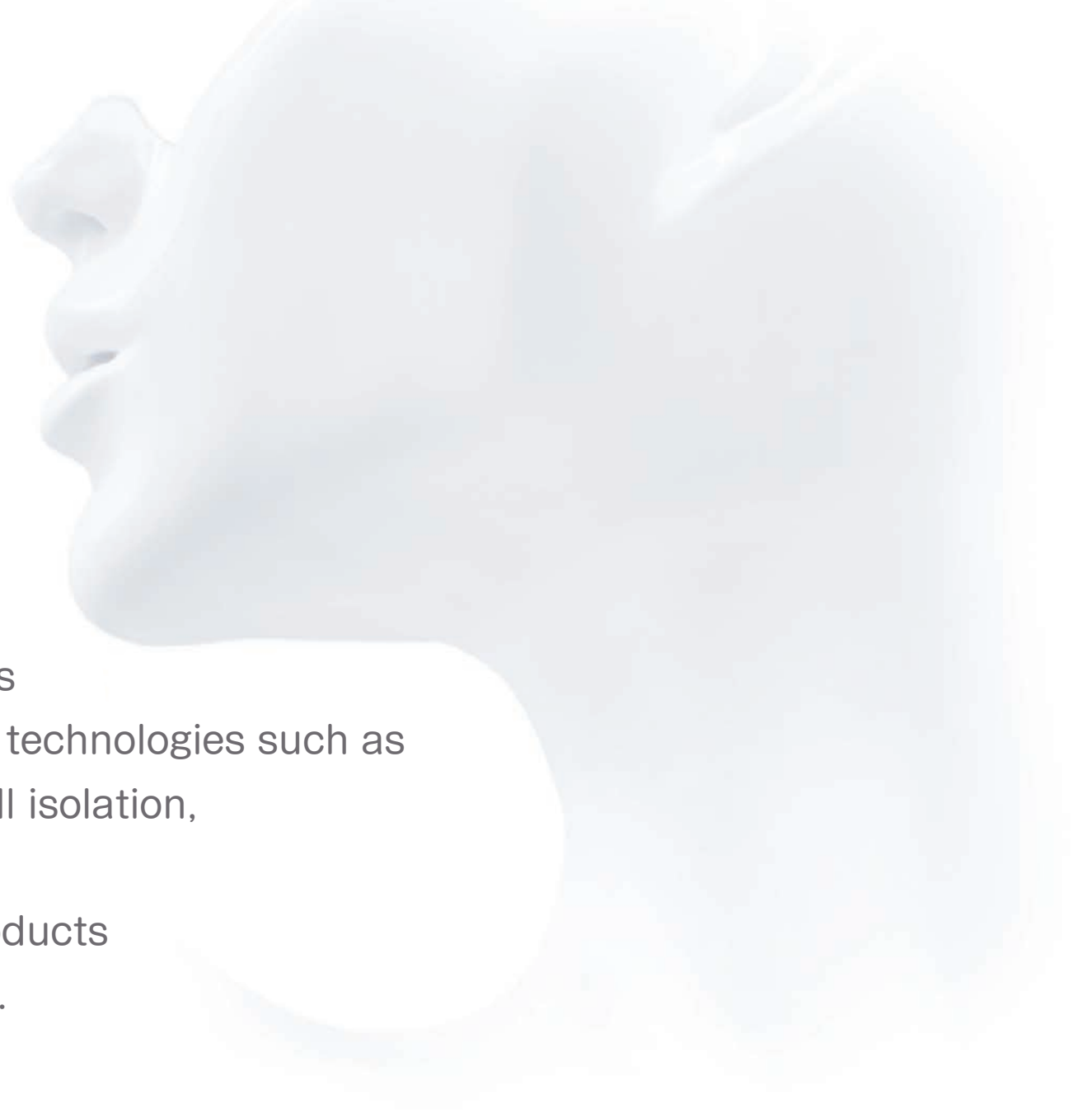
Company to Quantify Smell

## Concept

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Komi-hakko utilizes the technologies we have developed in our research technologies such as odor analysis, fermentation, one-cell isolation, and ingredient analysis.

We support the development of products that are useful for consumers' lives.



# Business

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## World's First Odor Quantification Technology

Quantifying how humans perceive odor components

The human olfactory receptor sensor

reproduces the mechanism of the human sense of smell.

Its greatest feature is that it can sense only the

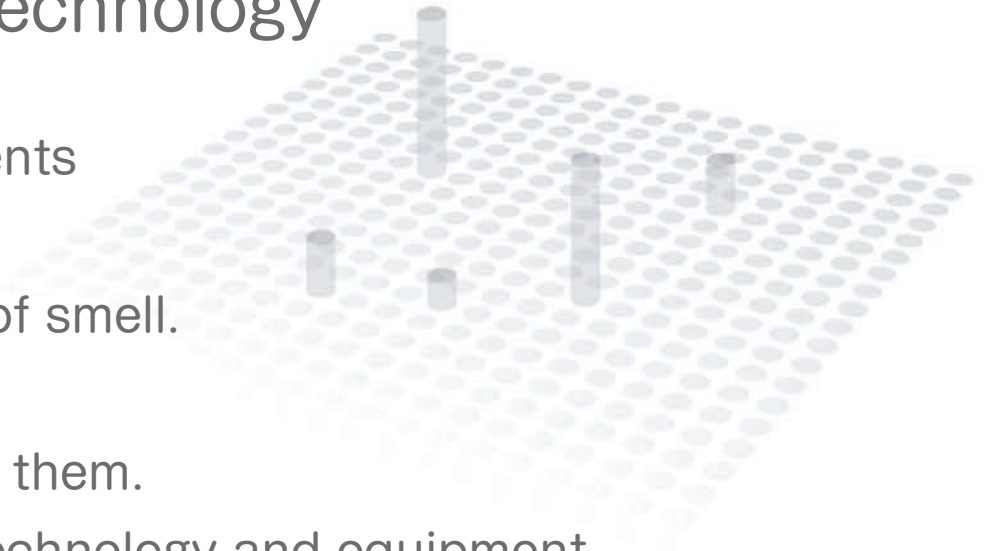
odors that humans perceive as humans perceive them.

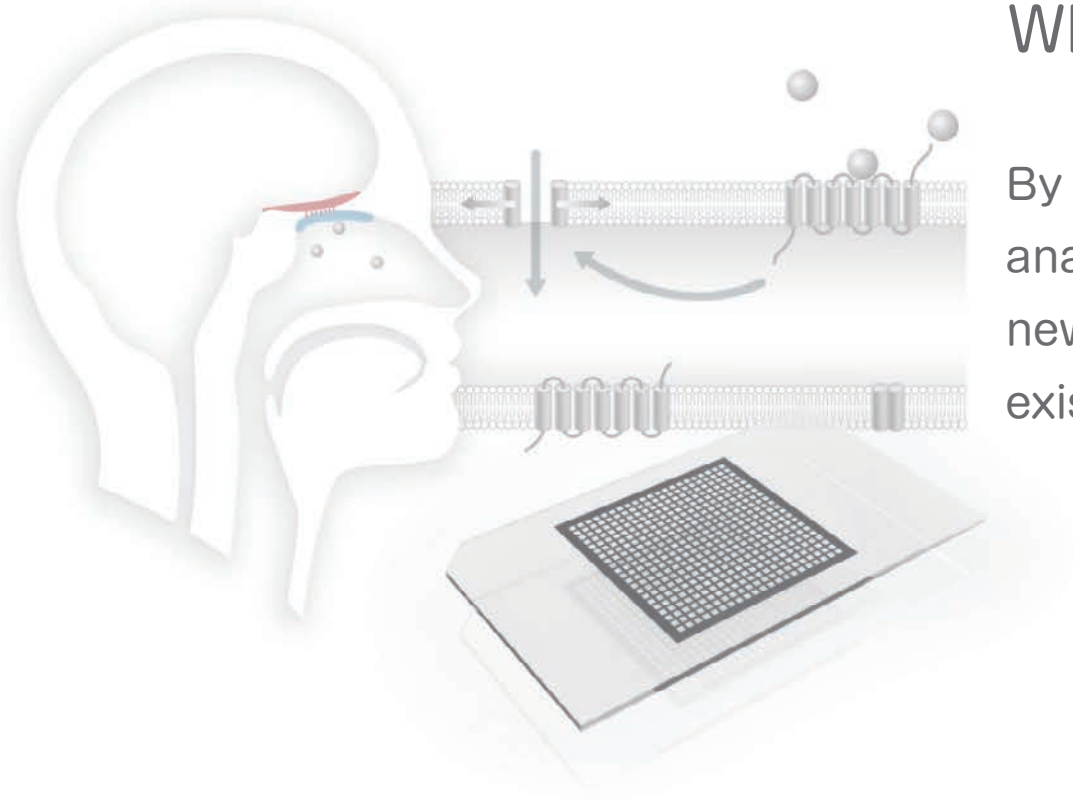
A sensor using living cells requires cell culture technology and equipment.

However, in order to increase the portability of cell-based sensors,

we have developed a new technology cell-free handheld sensors

that reflect the response of human olfaction through AI.





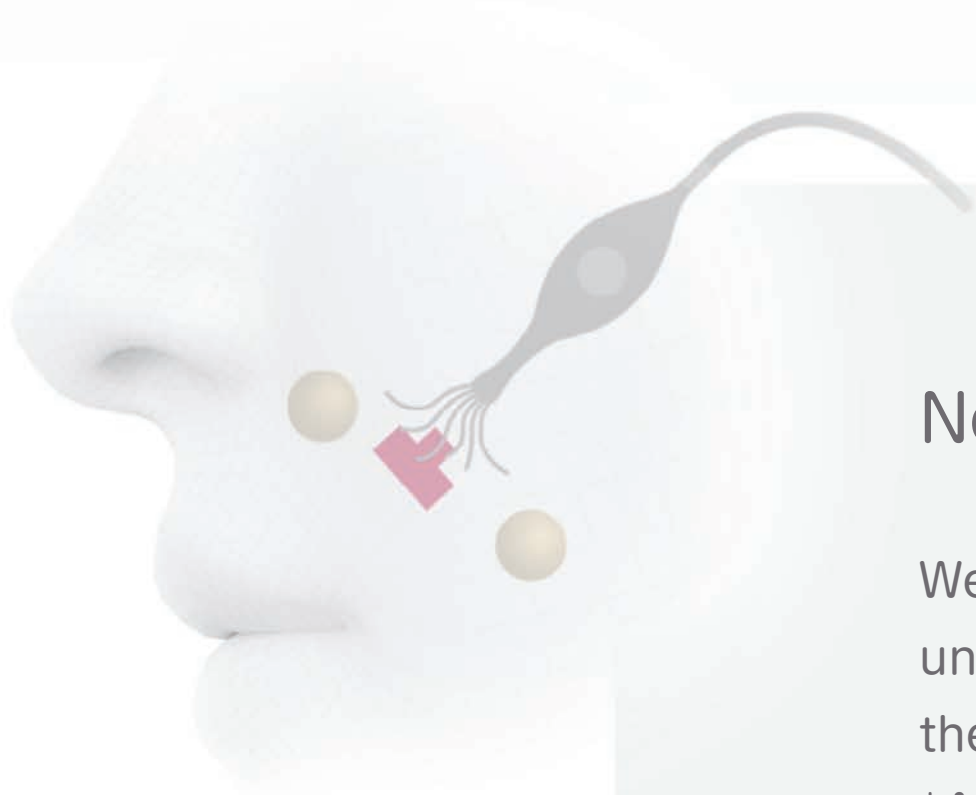
## What we can do by quantifying smells

By quantifying smells with flavor fermentation analysis technology, it is possible to develop new products and technologies that have never existed before using smells.

# Business

## What we can do by quantifying smells

By quantifying smells with Komi-Hakko analysis technology,  
the following new products and technologies related to smells can be developed



## New methods for odor control

We support product development using an unprecedented odor control method that targets the receptors that respond to malodors.

- \*Antagonist deodorant that covers the receptors.

- \*Modulator deodorant that modulates the receptor response

## Reconstruction of odor by odor database

Create a database of fragrance odors and reconstruct the desired odor with a different combination of fragrances

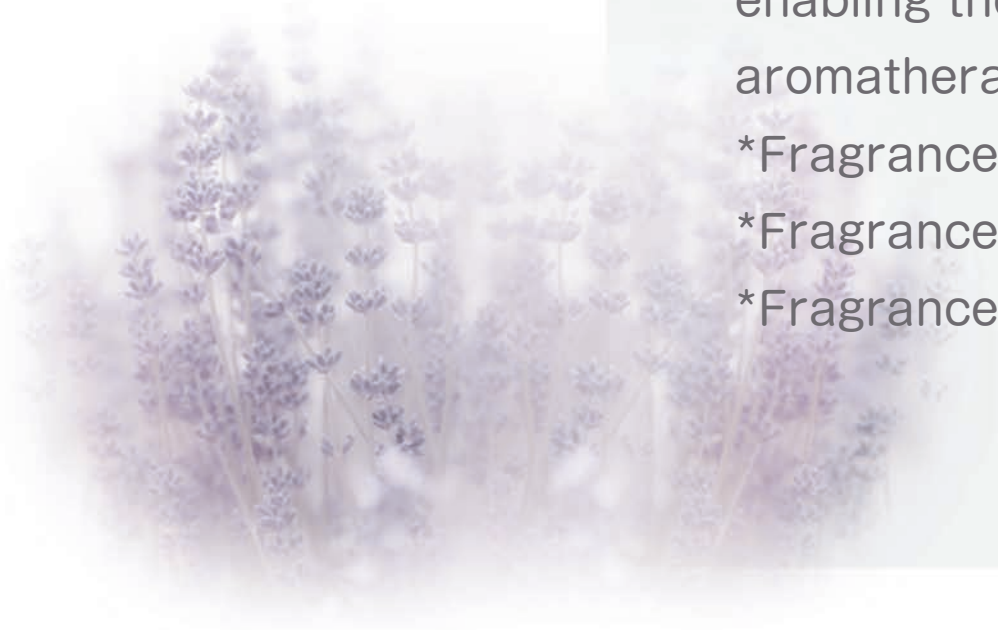
- \*Adding the sense of smell to VR with smell displays
- \*TVs that emit smells
- \*Real flavors replacing rare natural and other flavors
- \*Learning flavors that reconstitute toxic smells with non-toxic flavors
- \*AI flavoring that anticipates trends



## Control of physiological activity by odor

We integrate data on the components and physiological effects of fragrances used in aromatherapy with data on the response of olfactory receptors, enabling the development of fragrances for aromatherapy based on medical evidence.

- \*Fragrances that calm the mind
- \*Fragrances that enhance concentration
- \*Fragrances that promote restful sleep

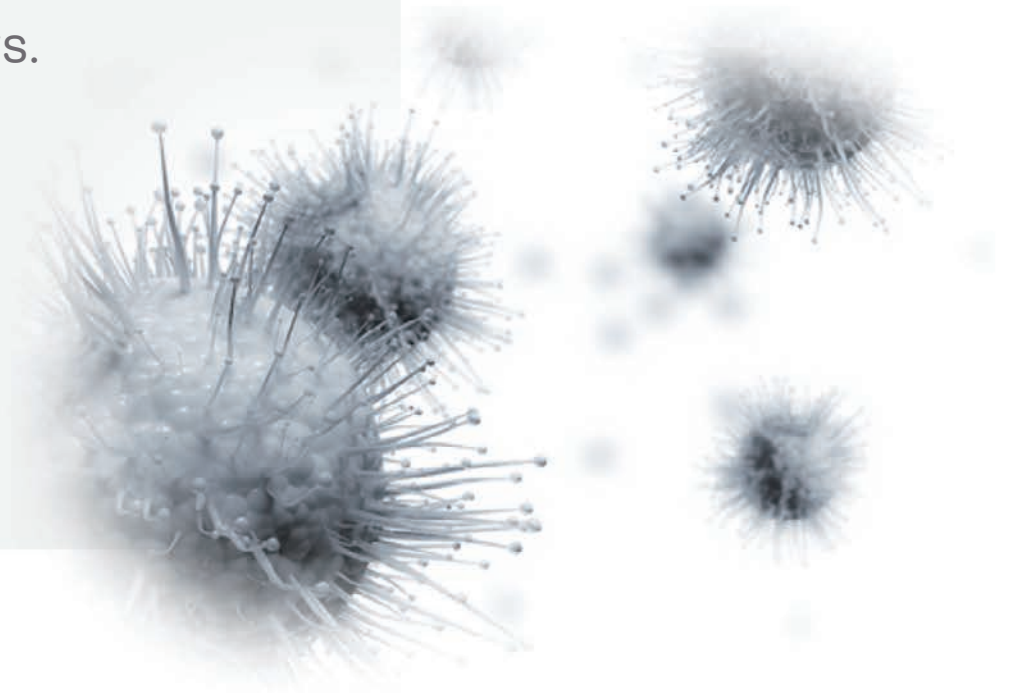




# Check for signs of various diseases

Identify receptors that respond to odors (urine, feces, body odor) that commonly appear in patients with each disease, and support the development of disease specific checkers.

- \*Infectious disease checker
- \*Cancer checker
- \*Parkinson's disease checker
- \*Health Care Toilet





## Standardization of Smell

By quantifying odors, we can accurately communicate, compare, and evaluate them

## Application to non-human olfactory receptors

The technology to quantify human olfactory receptors can also be applied to non-human receptors. This will support the development of effective and safe new insect repellents and attractants.

- \*Insect repellents and attractants for mosquitoes to prevent the transmission of diseases

- \*Prevention of vermin through smells that animals do not like



## Other developments

New technology and product development based on odor quantification has the potential to expand further.

- \*Quality control by quantifying smells

- \*Development of a mechanical sensor that can express human senses

# Company Profile

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Komi-Hakko Corporation

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HQ

550-0002 TAT Edobori Bldg 10F, Edobori 1-24-12, Nishi, Osaka, Osaka, Japan

Tel 06-6444-3630 FAX 06-3443-3632

R&D

565-0871 Technoalliance C Bldg 3F, Yamadaoka 2-8. Suita, Osaka, Japan

Tel 06-6876-3385 FAX 06-6876-3386

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Representative Director CEO    Kenji KUBO

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Director CSO

Shun' ichi KURODA, Ph.D.

## Achieved Results

2021,7,8

In-house project

### Reconstructing Odors, Real Flavors] Sample Completion

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Vanilla flavoring is made up of many different ingredients,  
but we are able to recreate those smells



with only three different flavors.  
This allows us to reduce the  
cost of raw materials and the  
blending process. Real Flavor",  
which reconstructs the real  
smells that humans perceive  
with other ingredients, reproduces  
a variety of smells.

2021,5,14

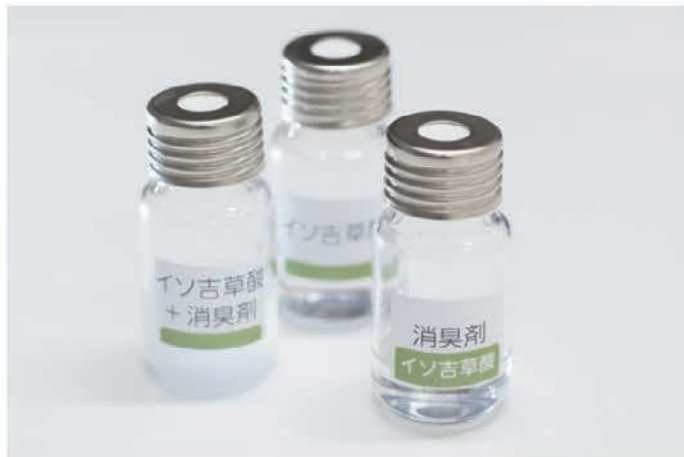
In-house project

## Sample of "receptor response inhibitor deodorizer" completed

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Aroma Fermentation's original deodorant that suppresses the response of receptors to eliminate bad odors has been completed.

You can experience a new deodorant that suppresses receptors that respond to isovaleric acid,



which is the component of sweat odor and natto odor.

We are already working with a number of companies to develop such a deodorant, and we expect it to be available soon. Our goal is to eventually develop a deodorizer that can eliminate all kinds of bad odors.

2021,5,14

In-house project

## Reconstruction of Odor, Real Flavor] Sample Completion

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Lavender and rose fragrances are composed of 30 to 50 different ingredients, but we are able to recreate those smells with only three fragrances. This allows us to reduce the cost of raw materials and the process of blending. "Real Flavor", which reconstructs the real smells that humans perceive with other ingredients, reproduces a variety of smells.





2021,5,14

In-house project

## [Reconstitution of odor and replacement of harmful substances] Completion of the sample

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The smell of camphor (camphor) is reconstituted without the use of substances that are harmful to humans. Such technology can safely convey what the smell of harmful substances smells like.

This technology can also be applied to



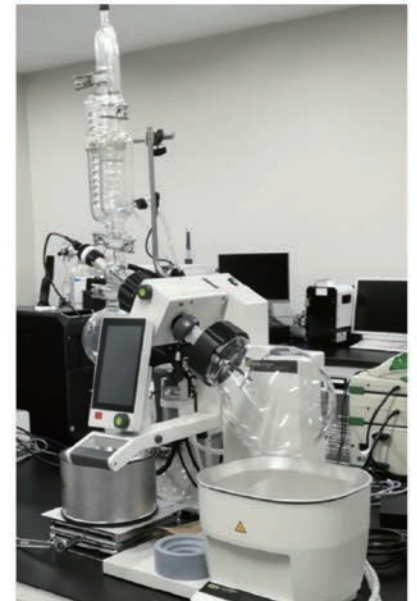
VR and other applications that reproduce a variety of scenes. It is possible to create fragrances that match the image of dangerous and harmful substances such as gunpowder, gasoline, and putrid smells, as well as imaginary creatures such as dragons and zombies. The range of applications is endless.

2021,5,14

Joint research and development

## Hamaya Dried Bonito Flavor Interim Report Sample Completed

We have submitted the first sample as an interim report for our joint research and development project with Hamaya Dried bonito flavors using human olfactory receptor response. It is a flavor that reproduces the smell of bonito soup stock, which is made up of more than 400 ingredients, by synthesizing several flavors without using dried bonito flakes. We will continue to develop this product in order to replace it with a cheaper and safer substance and to achieve accuracy close to that of the real flavor. Our goal is to create a flavor that can reproduce the aroma of Honkarebushi by simply adding a few drops to instant foods or hot water. This product will be the first of the "Real Flavor" products.



2019,10,1

Public funds, etc.

## Selected for A-STEP, the Japan Science and Technology Agency's Support Program for Optimum Deployment of Research Results

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The Japan Science and Technology Agency (JST) has selected our company's "Creation of AI perfumer using human olfactory receptor sensor" for the 2019 A-STEP "Industry-Academia Collaboration Phase (Seeds Development Type)" program. (140 million yen / 2.5 years) This will make it possible to reconstruct odors objectively and more realistically without using sensory perception. A-STEP is a technology transfer support program that aims to return research results to society by commercializing the results of scientific and technological research conducted at universities and public research institutions as technologies that are important to the national economy.

2017,10,30

Public funds, etc.

## Received the 18th New Business Grant [New Business Grand Prize

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We applied for the 18th New Business Grant sponsored by Senshu Ikeda Bank, and our "world's first odor analysis service based on human olfactory receptors and odor database service" was awarded the New Business Grand Prize of 3 million yen.



Senshu Ikeda Bank's New Business Grant is designed to support companies and entrepreneurs who have new and original business plans and who aim to create innovations by themselves or in collaboration with other companies.