

PRESSRELEASE



Shionogi Healthcare, Shionogi, and Pixie Dust Technologies Enter a Business Partnership Agreement to Launch Business Involving Brain Activation through Sound Stimulation - Aiming to Start Selling Products to Ordinary Households in Spring 2023 -

OSAKA, Japan, September 21, 2022 - Shionogi & Co., Ltd. (Head Office: Osaka, Japan; Chief Executive Officer: Isao Teshirogi, Ph.D.; hereafter "Shionogi"), Shionogi Healthcare & Co., Ltd. (Head Office: Osaka, Japan; President: Satoru Yoshimoto; hereafter "Shionogi Healthcare"), and Pixie Dust Technologies, Inc. (Head Office: Tokyo, Japan, Representative Directors: Yoichi Ochiai and Taiichiro Murakami; hereafter "PxDT") today announced that they have entered into a business partnership agreement (hereafter "the Partnership Agreement") to launch a business involving brain activation through sound stimulation (hereafter "the Business").

Based on the Partnership Agreement, Shionogi Healthcare and PxDT will proceed with discussions toward commencing the sale and promotion of "products for ordinary households that use sound (*1)" (hereafter "the Product"), with the aim of beginning sales in spring 2023. PxDT will work on the development of this product, Shionogi and PxDT will continue their joint research on "brain activation and improvement of cognitive function through sound stimulation".



<From the left of the photo>

Hiroyuki Kobayashi, Vice President of New Business Promotion Department, Shionogi & Co.

Satoru Yoshimoto, President of Shionogi Healthcare & Co.

Taiichiro Murakami, Representative Director of Pixie Dust Technologies, Inc.

Yousuke Miharu, Corporate Officer, Senior Vice President of Integrated Disease Care Division, Shionogi & Co.

■ About "Brain Activation and Improvement of Cognitive Function through Sound Stimulation"

One of the characteristics of cognitive dysfunction is reported to be a decrease in certain rhythmic activity (gamma waves) in the brain (*2). Since December 2021, Shionogi and PxDT have been collaborating on the development of new services focusing on changes in brain rhythmic activity caused by sensory stimulation, based on the concept of "enabling long-term intervention and dementia care by naturally stimulating the five senses in a way that is integrated into daily life." While conducting that research, we identified "sounds" that may intensify certain rhythmic activity (gamma waves) in the brain. We are currently working to build further evidence to underpin the development of services through "sound," such as natural processing of TV sounds and music to enhance brain activity for specific rhythms (*3).

■ Comments from Yousuke Miharū, Corporate Officer, Senior Vice President of Integrated Disease Care Division, Shionogi & Co.

With this business partnership, we are delighted to have the opportunity to bring to the world the "sounds" found through joint research by Shionogi and PxDT. And we will continue to verify the value of the "sounds" found by our two companies. Shionogi and PxDT will also work to develop services based on the "integration of dementia care into daily life" through sensory stimulation that goes beyond sound, and endeavor to provide new solutions to the problems faced by patients and society.

■ Comments from Satoru Yoshimoto, President of Shionogi Healthcare & Co.

Shionogi Healthcare's concept is "gentle and precise self-care for all people," and we believe that our participation in this project will help even more people to perform self-care. Japan's elderly population has been increasing continuously, and elderly people now account for 28.4% of the total population, the highest figure in the world*4. Against this backdrop, Shionogi Healthcare embraces the challenge of launching its first "sound stimulation product" service. By taking part in this project and selling the Product in collaboration with PxDT, we hope to support the extension of healthy life expectancy for more people and help address the social issue of a declining working population.

■ Comments from Taiichiro Murakami, Representative Director of Pixie Dust Technologies, Inc.

We are confident that through our collaboration with Shionogi and Shionogi Healthcare, we will be able to make further progress toward PxDT's vision of "digital innovation in sight and touch." Working with Shionogi, we will pursue research on approaching cognitive functions not only with sound but also with light and various other sensory stimuli, and intend to use the findings to develop a wide variety of products to realize the "integration of dementia care into daily life." In addition, by jointly marketing products with Shionogi Healthcare, we hope to get our products in the hands of as many people as possible while leveraging the strengths of both companies, and thereby tackle issues related to dementia that Japan is facing.

With the conclusion of this business partnership agreement, the three companies will deploy their respective expertise to further expand the possibilities of this business.

References:

1. Sonic technology that may enhance cerebral gamma wave rhythmic activity.
2. Herrmann, C. S., & Demiralp, T. (2005). Human EEG gamma oscillations in neuropsychiatric disorders. *Clinical neurophysiology*, 116(12), 2719-2733.
3. [Shionogi Press release on June 21,2022](#)

Conclusion of a basic agreement between Pixie Dust Technologies and Shionogi for joint research for improvement of cognitive function and brain activation by sound stimulation

4. Annual Report on the Aging Society 2022

Forward-Looking Statements

This announcement contains forward-looking statements. These statements are based on expectations in light of the information currently available, assumptions that are subject to risks and uncertainties which could cause actual results to differ materially from these statements. Risks and uncertainties include general domestic and international economic conditions such as general industry and market conditions, and changes of interest rate and currency exchange rate. These risks and uncertainties particularly apply with respect to product-related forward-looking statements. Product risks and uncertainties include, but are not limited to, completion and discontinuation of clinical trials; obtaining regulatory approvals; claims and concerns about product safety and efficacy; technological advances; adverse outcome of important litigation; domestic and foreign healthcare reforms and changes of laws and regulations. Also for existing products, there are manufacturing and marketing risks, which include, but are not limited to, inability to build production capacity to meet demand, lack of availability of raw materials and entry of competitive products. The company disclaims any intention or obligation to update or revise any forward-looking statements whether as a result of new information, future events or otherwise.

■ About Shionogi & Co., Ltd.

Shionogi has identified “improving social productivity” as one of the material issue (materiality) we should address. We will continue to strive to deliver innovative treatments for cognitive function disorders with high unmet medical needs and to thereby contribute to improving the quality of life and productivity of people suffering from mental / neurological disease and those who support them.

For more information, please visit <https://www.shionogi.com/global/en/>

■ About Shionogi Healthcare & Co., Ltd.

The Shionogi Group has been improving people’s health ever since its foundation more than 140 years ago. As part of that, Shionogi Healthcare was established in January 2016 with a philosophy of “always providing the best healthcare value necessary to protect people’s health.” We will enhance the competitiveness of our healthcare business by adding value through multi-layered operations and alliances, and contribute to the extension of healthy life expectancy through superior products, information, and services.

■ About Pixie Dust Technologies, Inc.

PxD, whose slogan is “Digitally Rebalanced,” is university startup that aims to be a driving force in leading us to a new equilibrium point by looking at the world from the perspective of digital technology. We will research and develop interface technologies that connect the digital and physical worlds, and contribute to their practical application by seamlessly incorporating them into society

For Further Information, Contact:

SHIONOGI Website Inquiry Form : <https://www.shionogi.com/global/en/contact.html>

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