

Media Contacts

Seema Kumar
Johnson & Johnson
+ 1 908-405-1144
skumar10@its.jnj.com

Meghan Marschall
Johnson & Johnson Innovation
+1 201-323-0578
mmarscha@its.jnj.com

**Johnson & Johnson Innovation’s Global Pursuit of Cutting-Edge Science
Yields 15 New Collaborations, Pushing Total Above 300**

Collaborations advance novel research across pharmaceutical, medical device and consumer healthcare sectors, in areas including 3D printing, the microbiome and immunotherapy

NEW BRUNSWICK, Jan. 5, 2017 — [Johnson & Johnson Innovation LLC](#) today announced 15 new collaborations spanning promising scientific areas, including 3D printing, the microbiome and immunotherapy. These collaborations, which are focused on developing novel healthcare solutions in areas of high unmet need such as depression, cancer and diabetes, bring the total number of strategic transactions to more than 300 since the establishment of Johnson & Johnson Innovation.

“We continue to pursue transformative healthcare solutions and form collaborations that explore the cutting edge of scientific research to achieve our primary goal of improving the quality of patients’ lives,” said Paul Stoffels, M.D., Chief Scientific Officer, Johnson & Johnson. “Through Johnson & Johnson Innovation, we are committed to identifying and advancing novel solutions in areas of significant need and creating customized deal structures with innovators in an effort to accelerate products to market.”

The new collaborations announced today by Johnson & Johnson Innovation include investments, out licensing and strategic deals for improving patient outcomes. These deals include:

Cutting-Edge Drug, Device and Digital Technologies

- **Eyeing a Promising NASH Treatment** – NASH is an obesity related global epidemic with no approved treatments that is rapidly becoming the leading cause of liver transplantation. Cannabinoid receptor 1 (CB1) is a promising drug target due to its involvement in the key mechanisms of the disease. CB1 also shows promise as a target in diabetic kidney disease, another area of great unmet medical need. Janssen Pharmaceuticals, Inc. has entered into a collaboration and option agreement with Bird Rock Bio, which is evaluating a CB1-targeting antibody, namacizumab, in a Phase 1 study. Janssen will collaborate with Bird Rock Bio during the trial and has the exclusive right to acquire the company following the Phase 1 data readout.
- **3D Printing the Knee Meniscus** – Tearing your meniscus, the “shock absorber” of your knee, is one of the most common knee injuries, and incidence could rise with an aging population. Surgical treatment of a torn meniscus may involve partial or complete removal which is associated with increased incidence of osteoarthritis. DePuy Synthes Products, Inc. has formed a collaboration with Aspect Biosystems to develop a prototype artificial meniscus using Aspect's proprietary Lab-on-a-Printer™ 3D printing technology that could benefit patients post-surgery.
- **Developing Better Depression Treatments** – As many as two thirds of people with major depressive disorder fail to respond to current antidepressants. In addition, these medicines can take up to six weeks to work. Janssen Pharmaceuticals, Inc. has formed a research, option and license agreement

with Amorsa Therapeutics, Inc. to use their proprietary ketamine analog technology. Under the collaboration, the companies plan to develop new antidepressants with rapid onset of action for patients with treatment-resistant depression.

- **RNA-Based Therapies for Infectious Diseases, Cancers** – Janssen Vaccines & Prevention B.V. has entered into a collaboration with Synthetic Genomics, Inc, to develop a ribonucleic acid (RNA) technology that enables a tuneable, multigenic approach to elicit desired antigen expression and immune response for a variety of applications. The aim of this technology is to enable the development of RNA-based therapies and vaccines that enhance and fine tune immune response against specific infectious diseases and cancer.
- **Developing the First Personalized Baby Sleep Coaching System** – Around the world, improving baby sleep is a leading concern for parents. Johnson & Johnson Consumer Inc., through its JOHNSON'S® BEDTIME® Baby Sleep App, and Rest Devices, Inc., through the Mimo Baby wearable monitor, have each studied sleep patterns for hundreds of thousands of babies. The companies have formed a collaboration to combine expert coaching and analytics into one app, called Nod, providing parents with an advanced sleep coaching system that helps babies sleep more soundly. Nod will be released in February 2017.

Innovation Through External Value Creation

- **Improving Prediction of Immunotherapy Success** – Immunotherapy has become one of the most active areas in oncology research. Nuclear imaging tools such as positron emission tomography (PET) and single-photon emission computed tomography (SPECT) provide a non-invasive way to probe dynamic interactions between immune cells and tumors, enabling early disease detection, selection of optimal therapy and assessment of treatment responses with the potential to accelerate the development and expanded use of immunotherapy. Janssen Biotech, Inc. has entered into an exclusive agreement to out-license the Centyrin® platform, a novel targeting technology discovered and developed by Janssen, to the Center for Probe Discovery and Commercialization (CPDC), which will leverage their radiopharmaceutical expertise to develop and advance nuclear imaging probes against immuno-oncology targets.

Translational Research Collaborations

- **Combating Cataracts** – Cataracts are a clouding of the lens of the eye that develops as a result of aging and leads to impaired vision, often described as looking through a frosty window, which can make it difficult to read or drive. Through the [Disease Interception Accelerator](#) (DIA), Janssen Pharmaceuticals, Inc. has entered into a licensing agreement with the University of Massachusetts to potentially intercept cataracts and/or presbyopia, another disease of aging that causes impaired vision. These University of Massachusetts-patented therapeutic candidates were discovered as part of a long-term research collaboration with Murugappan Muthukumar, Ph.D., Wilmer D. Barrett Distinguished Professor of Polymer Science and Engineering at University of Massachusetts Amherst.
- **Discovering New Treatments for Prostate Cancer** – Prostate cancer is one of the most common cancers in men, and primarily affects individuals over the age of 65. Janssen Biotech, Inc. has formed a research alliance with Weill Cornell Medicine to discover new therapeutics for treatment-resistant prostate cancer. Under the agreement, Janssen holds an exclusive option to negotiate a license for resulting product candidates.

- **Collaborating to Fight Malaria** – Malaria remains a major global health threat, causing an estimated 429,000 deaths in 2015 and disproportionately affecting children and pregnant women. To help develop better medications to protect these vulnerable populations from malaria, Janssen Pharmaceuticals, Inc. has formed a collaboration with Medicines for Malaria Venture, a product development partnership for malaria drug research, development and access, to research and develop vital long-acting injectable anti-malarial agents. The agreement supports the Johnson & Johnson Global Public Health organization and provides Janssen with the option to negotiate an exclusive license to the program as it progresses through clinical proof of concept.
- **Progressing Therapy for Early-Stage Rheumatoid Arthritis** - Janssen Biotech, Inc. has provided additional funding to support further research under its R&D Collaboration and Option to License Agreement with Dendright Pty Ltd to develop Dendright’s tolerizing immunotherapy for the treatment of patients with rheumatoid arthritis (RA). Dendright has also received additional funding for this research from Arthritis Queensland, a Queensland-based patient advocacy organization. The collaboration will enable the conduct of a first-in-human safety and tolerability study in the second half of 2017 as a key milestone in the development of a new liposomal drug product, DEN-181, which offers the potential to intercept RA at a very early stage. Dendright was established by UniQuest, the main commercialization company of The University of Queensland, based on the research of Ranjeny Thomas, M.D., professor of rheumatology at the The University of Queensland.
- **Karolinska Institutet Collaboration to Address Important Areas of Unmet Medical Need** – Johnson & Johnson Innovation, Janssen Pharmaceuticals, Inc. and Janssen Biotech, Inc. with the Karolinska Institutet (KI) announced four projects, selected from more than 80 applications, following a call for translational research proposals earlier this year. The selected KI investigators will now receive funding, resources and advice from Janssen to investigate: biomarkers in treatment-resistant depression and suicide risk; biomarkers in virus-induced type 1 diabetes through the DIA; immunological approaches in chronic hepatitis B viral infection and liver biology; and immune profiling of early prostate cancer.

JLINX Unveils First Resident Companies

- **Microbiome-Based Solutions for Skincare** – Our skin is home to billions of good and bad bacteria, which contribute to conditions ranging from acne, eczema and rosacea to aging. S-Biomedic has developed a method to directly modulate the skin microbiome with applications in dermatology and the cosmetic industry. Johnson & Johnson Innovation – JJDC, Inc. (JJDC) has invested in S-Biomedic and the company will become a member of the JLINX community.
- **Managing Metabolic Disorders Through The Microbiome:** Caelus Health is developing microbiota-based products for early intervention in cardio-metabolic disease. Caelus’ lead product results from the reverse engineering efforts of fecal microbiotic transplant studies conducted in patients with metabolic syndrome disorder. Caelus will join the JLINX community.
- **RNA-Based Immunotherapies** – eTheRNA’s mission is to help patients overcome certain cancers and infectious diseases by developing novel immunotherapies that target the fundamental role of dendritic cells in the human immune system. eTheRNA’s proprietary mRNA-based TriMix platform is the first rational-designed technology that can boost dendritic cell activity and maturation leading to a more comprehensive, sustainable and safe enhancement of the patient’s immune system as supported by early clinical data. eTheRNA will join the JLINX community.

- **Proof-of-Concept and Biomarker Studies for Cancer Treatments** – Octimet Oncology is developing selective early clinical stage MET kinase inhibitors that hold potential as personalized cancer treatments. Octimet will join the JLINX community.

Johnson & Johnson Innovation launched JLINX in 2016 in partnership with Bioqube Ventures. Located on the Janssen R&D Campus in Beerse Belgium, JLINX is designed to identify and nurture early stage companies with the potential to transform human health. By offering startups a spectrum of flexible resources and approaches to grow and collaborate across the European life science ecosystem, JLINX aims to catalyze scientific advances and accelerate breakthroughs.

Johnson & Johnson Innovation includes four regional innovation centers that facilitate deal making; eight incubators to advance early stage innovation; venture capital funding through Johnson & Johnson Innovation – JJDC, Inc.; and collaboration with established pharmaceutical companies and large and mid-size biotech companies through Johnson & Johnson Innovation – Janssen Business Development. The Johnson & Johnson Innovation Center for Device Innovation at the Texas Medical Center (CDI @ TMC) was [launched](#) as a collaboration with the Texas Medical Center to accelerate the development of medical devices. CDI @ TMC is scheduled to open later this year.

Since its inception, Johnson & Johnson Innovation has yielded more than 300 strategic relationships with life science innovators, including:

- More than 230 collaborations and other strategic relationships with life science companies by the Johnson & Johnson Innovation centers in California, Boston, London and Asia Pacific.
- Strategic investments by JJDC currently active in more than 100 companies.
- More than 200 companies incubated in Johnson & Johnson Innovation / JLABS
- A total of 33 collaborations formed between companies residing at JLABS and the Johnson & Johnson Family of Companies.

“Through Johnson & Johnson Innovation, we are building relationships with entrepreneurs around the world, providing us with a truly global view of the opportunities to advance healthcare,” said Robert G. Urban, Ph.D., Global Head, Johnson & Johnson Innovation. “This broad perspective enables us to identify the best ideas, no matter where they originate, that hold potential to revolutionize healthcare and transform patients’ lives.”

About Johnson & Johnson Innovation

Johnson & Johnson Innovation LLC focuses on accelerating all stages of innovation worldwide and forming collaborations between entrepreneurs and Johnson & Johnson’s global healthcare businesses. Johnson & Johnson Innovation provides scientists, entrepreneurs and emerging companies with one-stop access to science and technology experts who can facilitate collaborations across the pharmaceutical, medical device and consumer companies of Johnson & Johnson. Under the Johnson & Johnson Innovation umbrella of businesses, we connect with innovators through our regional Innovation Centers, Johnson & Johnson Innovation / JLABS, Johnson & Johnson Innovation – JLINX, Johnson & Johnson Innovation – JJDC, Inc. and our Business Development teams to create customized deals and novel collaborations that speed development of innovations to solve unmet needs in patients. For more information, visit www.jnjinnovation.com or follow [@JNJInnovation](https://twitter.com/JNJInnovation).

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