

# Got a chronic disease and fear of needles? A prick-free natural alternative is on the horizon

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A Charles Darwin University (CDU) researcher is a step closer to replacing the needle to deliver drugs in the treatment of many chronic

diseases.

CDU pharmaceutical scientist Dr. Nazim Nassar and RMIT biophysicist Professor Stefan Kasapis have filed an application in the US patent office for a new technology of a "gel-like casing" in an oral tablet form to deliver naturally occurring therapeutic proteins and vaccines.

Dr. Nassar focuses on using naturally occurring [chemical compounds](#), such as that in proteins and plants, as an [alternative treatment](#) to synthetic compounds that are man-made.

He said the hydrogel ball could eliminate injections to deliver anticancer, antimicrobial, and immune system modifying remedies and reduce the need to keep the treatment cool in a fridge over time.

"For example, patients who are being treated for blindness caused by proliferative diabetic retinopathy, currently, they have to have an injection into their eye, which certainly isn't the most tolerable experience," he said.

"There are also many challenges with managing and administering treatments in the pharmacy, including a high equipment cost, the requirement for health care staff to supervise, and patients disliking or fearing needles, even though this is the most effective way of delivering the treatment.

"Not to mention that refrigeration is necessary during storage and transport, which certainly increases medication cost enormously and limits the amount of room for storage.

"Pharmacies could be like the cold storage area in supermarkets in ten years with the number of treatments that need to be kept cold."

As a practicing pharmacist, Dr. Nassar said reducing the strain on the health care system and its staff also cuts sector and government funding costs, which could result in hundreds of thousands of dollars redistributed to other medical areas for both patients and professionals.

"The demand for biological medicines, known for their treatments with fewer side effects and less resistance against them by [cancerous cells](#), for example, is growing with the increasing global prevalence of chronic conditions, such as cancer, diabetes, and cardiovascular diseases," he said.

"Our aging population is also growing, and so is the prevalence of associated health issues, so the health care system needs more ways to ensure treatment is efficient and effective as much as possible."

The study showed that using the hydrogel as a carrier controls the drug's release at the most effective site for absorption in the intestine.

"When the gel expands in the [small intestine](#), it allows water inside, which then transports the biological medicine out of the gel into the small intestine and then transports to the bloodstream," he said.

"The hydrogel can withstand temperatures up to 40 degrees Celsius and an acidity of pH 2.4, which means it protects the biological medicine, such as insulin, from stomach acidity."

"So, this method of drug delivery is more specific and more effective. It can handle high temperatures and acidities, cause fewer side effects, and doesn't break down as quickly. This hydrogel could encase all sorts of vaccines and other drug delivery methods that can be taken orally."

The following study stage is animal trials to determine how the vaccine diffuses in the intestine and activates the [immune system](#).

Dr. Nassar published a [paper](#) on hydrogels in the *International Journal of Pharmaceutics* last year with Professor Kasapis.

Provided by Charles Darwin University

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