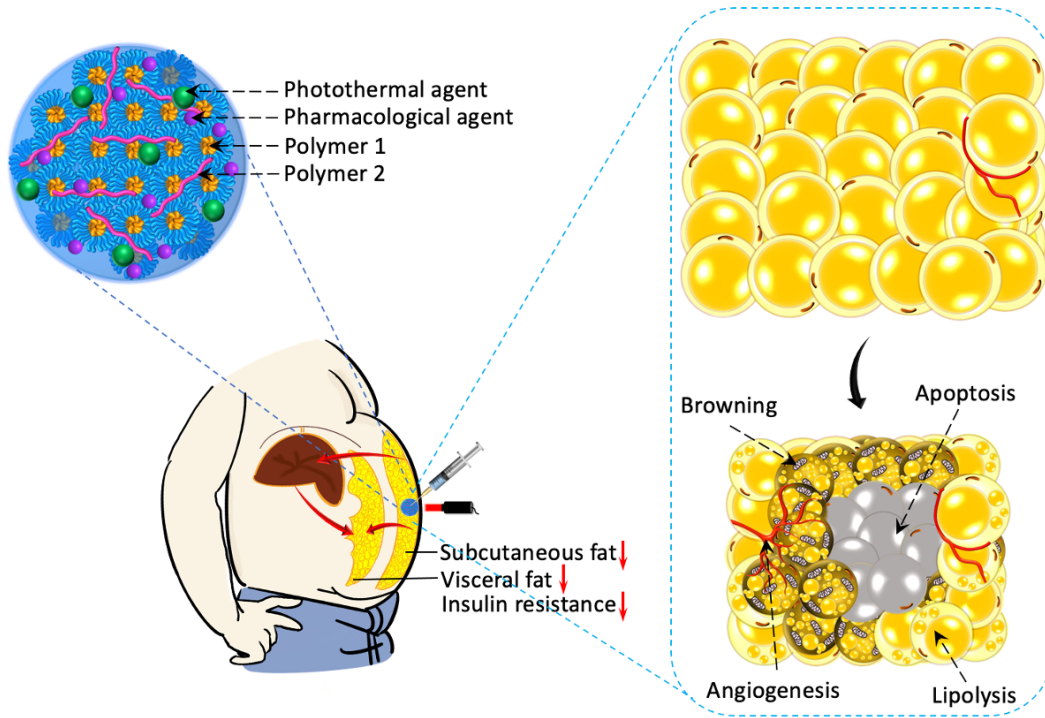


**TECH OFFER**

**Transdermal Photothermal Therapy for Obesity, Metabolic Diseases, and Body Sculpting**



**KEY INFORMATION**

TECHNOLOGY CATEGORY:

Healthcare - Pharmaceuticals & Therapeutics

Healthcare - Medical Devices

TECHNOLOGY READINESS LEVEL (TRL): **TRL4**

COUNTRY: **SINGAPORE**

ID NUMBER: **TO174774**

**OVERVIEW**

Despite the increasing prevalence of obesity, all FDA-approved medications, which act indirectly on the central nervous system to suppress appetite or on the gastrointestinal tract to inhibit fat absorption, suffer from poor effectiveness and side effects. Most of these medications have been withdrawn from the market. Although liposuction performed in clinics can effectively remove targeted subcutaneous fat, it suffers from invasiveness, high costs, associated risks, induction of compensatory increase of visceral fat. Although thermal lipolysis induced by high-power laser energy is a non-invasive way to reduce subcutaneous fat, its effectiveness is limited and it often causes skin burning. Both liposuction and laser lipolysis cannot improve whole-body metabolism.

The technology owner has developed a transdermal mild photothermal therapy directly acting on the root of evil, i.e. subcutaneous fat, to induce its ameliorating remodelling (browning, lipolysis, angiogenesis, and apoptosis), based on the injectable hydrogel encapsulated with photothermal agent. Browning refers to the conversion of energy-storage white fats into energy-burning brown fats. Further, combining with pharmaceutical therapy by codelivery of pharmacological agent leads to a

strong therapeutic synergy. This method not only ensures high effectiveness and low side effects due to localized and targeted application but also remotely creates significant improvements in whole-body metabolism (e.g., reduction of visceral fat, relief of diabetic symptoms). In addition, this technology is applicable for cosmetic purposes, e.g., body contouring and reduction of double chin.

The technology owner is seeking potential biotechnology companies, clinicians, and other partners to clinically translate and commercialize this technology. Possible modes of collaboration include R&D, process, and product development.

## TECHNOLOGY FEATURES & SPECIFICATIONS

Photothermal agents and pharmacological agents are encapsulated in biocompatible and biodegradable hydrogel which retains the therapeutics to ensure sustained effects. After being injected into subcutaneous fat depots (e.g., belly fat) using an insulin needle or an automated injection device with minimal pain, NIR irradiation at each injection site will be applied for only five minutes using a portable laser source, one to three times a day for several days without the need of another injection. This described procedure (injection + laser treatment) can be applied once or several times. Obvious mass reduction of the treated fat and other beneficial effects on the whole-body should be resulted. In contrast to laser lipolysis, this procedure shall be much more effective, pain free without causing skin burning, and profoundly beneficial. It can be conducted in clinics by professionals or be self-administered at home for long-term care.

## POTENTIAL APPLICATIONS

The primary application area of our technology is for treating obesity and associated metabolic diseases (e.g., type 2 diabetes). This technology can also be used for non-therapeutic or cosmetic purposes, including contouring, sculpting, or slimming one or more regions of the subject's body for a desirable appearance. To be specific, this technology can locally remove stubborn fat below the chin, or in thigh, abdomen, thorax, flank, upper limb, upper body, lower limb, back, etc.

## MARKET TRENDS & OPPORTUNITIES

As highlighted by Mordor Intelligence, the anti-obesity drugs market was valued at about US\$ 1,690 million in 2020, and it is expected to reach US\$ 4,250 million in 2026, registering a CAGR (compound annual growth rate) of 15% over the forecast period, 2021-2026. And according to IMARC Group, the global body contouring market reached a value of US\$ 7.3 billion in 2021, and is expected to reach US\$ 11.1 billion by 2027, exhibiting at a CAGR of 6.9% during 2022-2027. This technology provides an unprecedented solution with high effectiveness and low risks.

## UNIQUE VALUE PROPOSITION

- Non-invasive targeted treatment on subcutaneous fat
- Drastic reduction of subcutaneous fat and visceral fat
- Relief of obesity-associated metabolic diseases (e.g., diabetes)
- Low risks and low side-effects
- High effectiveness
- Self-administrable