

Freedomwaves Srl

Modulated Ultrasound Waves to reshape Drug Delivery

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Freedom Waves Srl is developing an **innovative medical device - WAVER** - that allows to **reshape drug delivery** and internalization performances in several significant applications. The **disruptive proprietary technology** improves therapeutic effectiveness, reducing side effects on other tissues, operating as a **game changer** on the overall clinical environment.

The core technology relies on **modulated ultrasound waves** which work as a very effective mean to improve the permeability of treated tissues to drugs and other substances, penetrate cells' membrane for a better delivery (**sonoporation**) and to make drug carriers to release their content at the final destination (**insonation**).

This solution shows specific effectiveness when applied in combination with **nano-carriers** transporting drugs in a target region, which are applied in several chemotherapies by many clinical protocols. Many of research projects and clinical trials are rapidly on going about this carrier technology aiming to implementing higher selectivity of treatment and decreasing side effects

Traditional drugs typically act at systemic levels, spread the active principle to different organs and areas of the body and usually have significant toxicity both at local and systemic levels. **TYPICALLY, LESS THAN 10% OF A DRUG REACH THE TARGET AREA WHILE THE REMAINING IS WASTED IN THE BODY**, which leads to undesired **side effects**. Among these, we have hair loss, anemia, fatigue, nausea, vomiting, diarrhea, infections, bruising or small bleeding, and even cognitive problems could be appearing. Another main collaterals often associated with chemotherapy are nephrotoxic and cardiotoxic effects, which lead to further clinical problems both before and after the treatment. ¹

All these factors have a direct impact on hospitals in regard to **hospitalization costs**, which vary drastically according to the country and treatment time, also avoiding further hospitalizations due to the sequelae caused by the administration of chemotherapy drugs in a non-targeted manner.

At present, **CURRENT AVAILABLE SOLUTIONS ARE BASED ON A NEW GENERATION OF DRUGS**, which incorporate the active principle within **nano-carriers** to avoid the drug damaging and reducing healthy organs side effects. Exploiting the biological properties of cancer tissues and the permeability of blood vessels that surrounds the pathological area, these nano-carriers show an **enhanced delivery** of the drug contained in their core specifically to the tumor area. Being nanomedicine a relatively new and rapidly evolving field there are many researches going on and undergoing clinical trials on this carrier technology aiming to implement **higher selectivity to pathological biological markers** and reduced side effects.

[Literature and scientific papers](#)

<https://archive.ismrm.org/2012/1574.html>

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