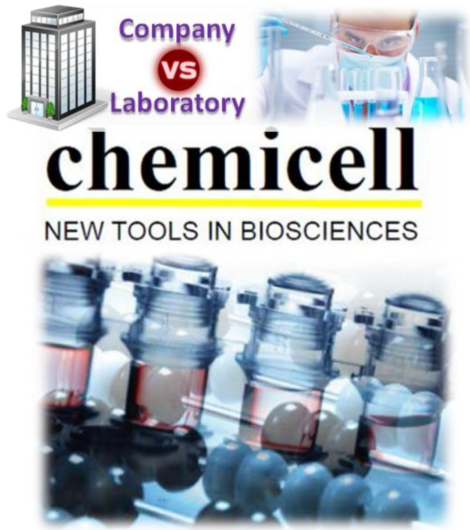

Commercially produced materials, may be rapidly pushed through the medical approval processes since commercial drive and company resources are focusing in the delivery of the new therapy to the patient as rapidly as possible.

Cancer is one of the most common diseases nowadays. Despite the fact that there are many treatments for cancer, their results are doubtful. In most cases, the drugs or the radiation used for the treatment affect the healthy tissue and lead to additional problems for the patient. For this reason the detection of the appropriate drug with the fewest possible side effects is crucial. Magnetic hyperthermia appears to be a promising therapy for the treatment of cancer since it is based on the local heat of cancer cells by using an external magnetic field. Specifically, magnetic hyperthermia's drugs contain magnetic nanoparticles that locally emit heat under the use of an external magnetic field. In this way only the cancer cells are dying due to their different behavior under elevated temperatures.

However, up to now there are no drugs both leading to maximum temperature increase and ensuring their biocompatibility.

So, the purpose of this bachelor thesis is the study of the thermal response of specific commercial ferrofluids. Those ferrofluids are already being used in other medical applications, thus they are biocompatible. Therefore their good thermal response will lead to an effective, immediate and economic way of treatment. Contrary to lab-made magnetic nanoparticles, commercial ferrofluids may be rapidly pushed through the medical approval processes since their applicability has already been addressed successfully (i.e. formulation, reproducibility, toxicity and quality assurance) in conjunction with the strong companies' drive in the fast delivery of the new therapy to the patient.

In this work we examined the commercial ferrofluids "FluidMAG-DX" available by Chemicell Company. These ferrofluids are aqueous suspensions of superparamagnetic nanoparticles of Maghemite encapsulated in dextran. The hydrodynamic diameter of this nanoparticles was 50,100,200nm.The concentration of the specimens FluidMAG-DX-50nm, FluidMAG-DX-100nm, FluidMAG-DX-200nm that were examined in magnetic hyperthermia (after dilution) was: 0.1, 0.2, 0.5, 1, 2, 5 mg/mL and the experiment took place for frequency f=765 kHz in an external magnetic field with alternative amplitude (200, 250, 300 Oe). The thermal response of some specimens which was measured by a factor known as SLP or either ILP was very promising making the commercial ferrofluid FluidMAG-DX a good candidate for magnetic hyperthermia.

The tunable magnetic heating characteristics of the ferrofluids were correlated with particle, field and colloidal solution features. Our work revealed a size-dependent magnetic heating efficiency together with fast thermal response, features that are crucial for adequate thermal efficiency combined with minimum treatment duration and show the potential of such materials as multifunctional theranostic agents.