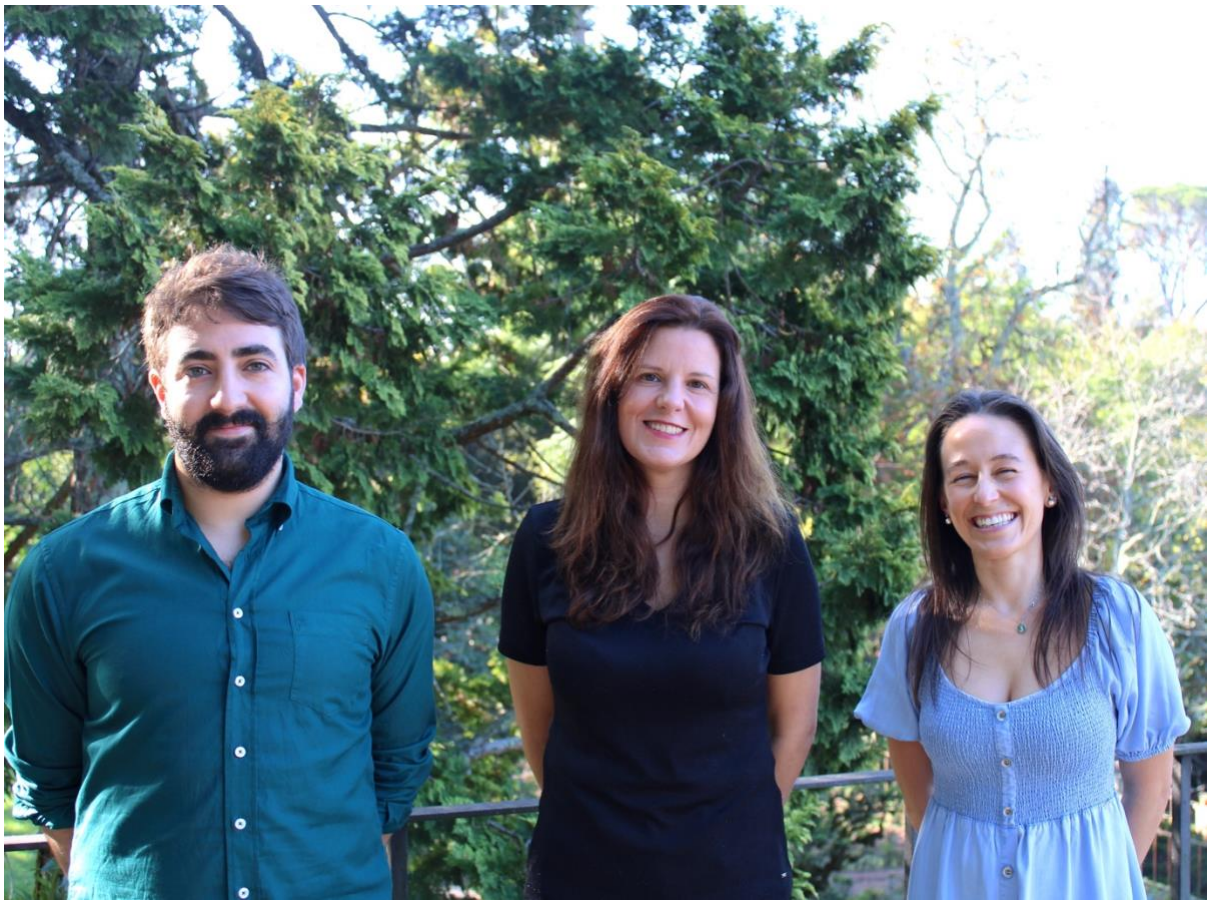
Platform developed at the University of Coimbra makes it possible to predict the effect of the combination of drugs to treat cancer



Researchers from the Center for Neurosciences and Cell Biology at the University of Coimbra (CNC-UC) have developed a new online platform, Synpred, capable of using algorithms from the field of artificial intelligence to predict combinations of anticancer drugs.

Currently, the development of drug resistance in cancer is a common problem that results from a variety of factors, such as overexposure to anticancer drugs. Irina Moreira, study leader, researcher at CNC-UC and professor at the Department of Life Sciences of the

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Faculty of Sciences and Technology of the University of Coimbra (FCTUC) explains that, **"in the clinical area, the problem of drug resistance is minimized by administering, not one, but a combination of drugs with a synergistic effect, that is, drugs that together reinforce the action of each other, increasing their effectiveness and reducing side effects."** However, realizing **"which pharmacological combinations operate safely and effectively, in addition to being complex, is a highly expensive and time-consuming process",** adds the researcher.

To respond to this problem, Irina Moreira's team developed the platform Synpred with the aim of anticipating the biological response of the combination of anticancer drugs. The researcher clarifies that, in developing the prediction model, **"pharmacology data from compounds with potential anticancer activity and biologically based data, among others, concerning cell lines of several well-characterized types of cancer were used. Afterwards, a panoply of computational algorithms was used, generating, in the end, methods combined with an improved predictive capacity"**.

Unlike other existing methods, Synpred explore six different models to characterize drug combinations with a synergistic effect, evaluating which is the best to include in the development of this type of prediction models.

The study, published in the journal *GigaScience* aims to create conditions to replace the administration of high doses of anticancer drugs with reduced concentrations of more specific drug pairs, avoiding potential side effects of using this medication for a long time, such as the development of drug resistance. **"Synpred is highly specific, and allowed us to verify, for example, the importance of the type of cell tissue (skin, lung, etc.), as a determining factor in drug combinations with a synergistic effect"**, emphasizes Irina Moreira.

This new technology represents an advance in the area, constituting an interactive public platform that can be used intuitively, through the website .

In addition to Irina Moreira, the research team included researchers António Preto, Pedro Matos-Filipe and Joana Mourão, who are also researchers at the CNC-UC. The work was funded by the Fundação para a Ciência e Tecnologia (FCT) through the project PTDC/CCI-BIO/31356/2017 – "Application of *Deep learning* to the investigation process of new anticancer drugs".
The study is available here .

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