# Development of a pharmacokinetic simulation tool for Ibrutinib to enable treatment individualization

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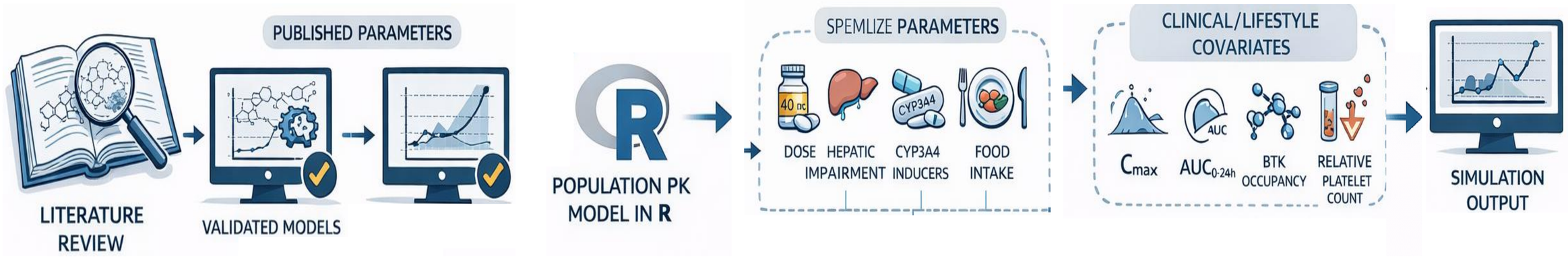
## Background and Importance


## Aim and Objectives

To develop a pharmacokinetic simulation tool for ibrutinib integrating cumulative modifiers of drug exposure, aiming to optimize therapeutic outcomes and support individualized treatment decisions.

## Material and Methods




## Results

**Standard Conditions**

| Parametro | Valor |
|---|---|
| Cmax | 23.6 ng/mL |
| AUC0–24h | 265.2 ng·h/mL |
| BTK Occupancy | >95% |
| Platelets | 89.7% of baseline |

Platelet reduction used as an indirect marker of hematological toxicity

In all scenarios, BTK occupancy >95%

**Relative Change vs. Standard**

| Factor/ Condition | Cmax Change | Platelet Reduction |
|---|---|---|
| Strong CYP344 Inhibitor | +172% | -18% |
| Moderate CYP344 Inhibitor | +65% | -7% |
| Moderate Hepatic Impairment | +45% | -5% |
| Food Intake | +49% | -5.7% |
| Smoking | -30% | NA* |

**144 SIMULATIONS**

VIRTUAL PATIENT CLINICAL SCENARIOS

## Conclusions and Relevance

This population-based simulation tool accurately reproduced published pharmacokinetics and quantified the impact of clinical modifiers on ibrutinib exposure, efficacy, and safety. It provides a practical support for individualized dosing, improving therapeutic precision and reducing risk.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