CYP450 isoenzyme-associated food-drug interactions are a neglected issue in medicines information

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Background

Interactions are occurring in the course of liberation, absorption, distribution, metabolism, and excretion of active ingredients, or at the target receptors (Fig. 1). Two concomitantly used substances interact with a probability of 13%, 4 with 38%, and 7 with 82% [1] depending on the individual genetic CYP450 isoenzyme patterns (Fig. 2, 3). Therefore, the elevated number of components comprised in food may result in an alarmingly high frequency of food-drug interactions and, consequently, in pharmacotherapy failure.

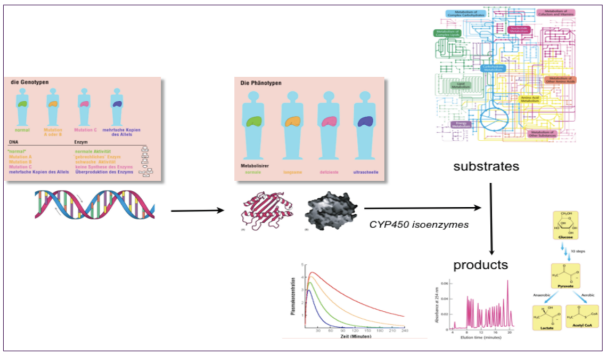

Fig. 2: CYP450 isoenzyme phenotypes determine the relevance of interaction risks

1A1	2A6	3A4	4A11	5A1	7A1	8A1	11A1	17A1	19A1	20A1	21A2	24A1	26A1	27A1	39A1	46A1	51A1
1A2	2A7	3A5	4A22		7B1	8B1	11B1						26B1	27B1			
1B1	2A13	3A7	4B1				11B2						26C1				
	2B6	3A43	4F2														
	2C8		4F3														
	2C9		4F8														
	2C11		4F11														
	2C18		4F12														
	2C19		4F22														
	2D6		4X1														
	2E1		4V2														
	2F1		4Z1														
	2J2																
	2R1																
	2S1																
	2U1																
	2W1																

Fig. 3: 10 of 57 human isoenzymes (as highlited in orange) are listed in current pharmakology-relevant interaction tables. The relevance of the remaining (specific) isoenzymes has not yet been recognized

Purpose

The aim of this study was to **assess whether adequate information on food-drug interactions is made available** from manufacturers of medicines.

Materials & Methods

All online monographies according to the "Questionnaire for the information of hospital pharmacists about proprietary medicines" were retrieved from http://www.gsasa.ch and screened for information on interactions involving food.

Results

From a total of 157 monographs, **90 (57%) declared food-drug interactions as being "not applicable" , "unknown", or informed that "no data" was available**. 23 (15%) explicitly mentioned that their medicine "...is not influenced by food intake". Interactions disclosed relate to absorption (12%) or metabolism (11.5%) (Fig. 1).

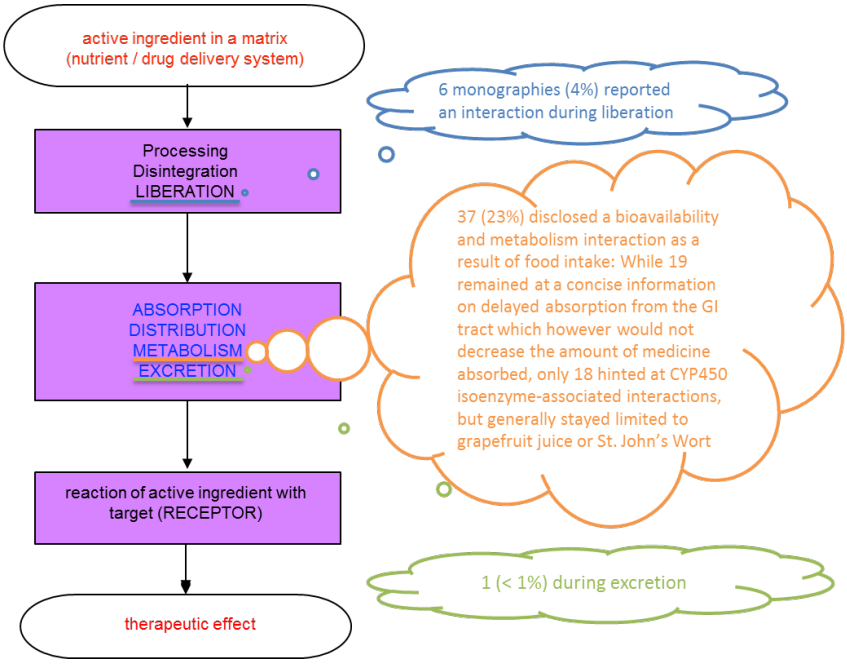

Fig. 1: Interactions concern several pharmacokinetic and/or pharmacodynamic steps

Conclusion

Food-drug interactions have consequences which go beyond absorption from the GI tract. Although many food ingredients such as **caffeine**, **flavonoids**, **licorice**, **spices**, and **vitamins** are known to be **inducers** or **inhibitors** of some of the **57 known human CYP450 isoenzymes** [2-5], **they are not taken into account in the medicines' information** made available by manufacturers. Thus, risks arising from **isoenzyme-associated food-drug interactions** are a neglected aspect of medicines' information.

References
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5. SuperCYP (http://bioinformatics.charite.de/supercyp/)

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