## Role-Playing Between Environmental Pollutants and Human Gut Microbiota: A Complex Bidirectional Interaction

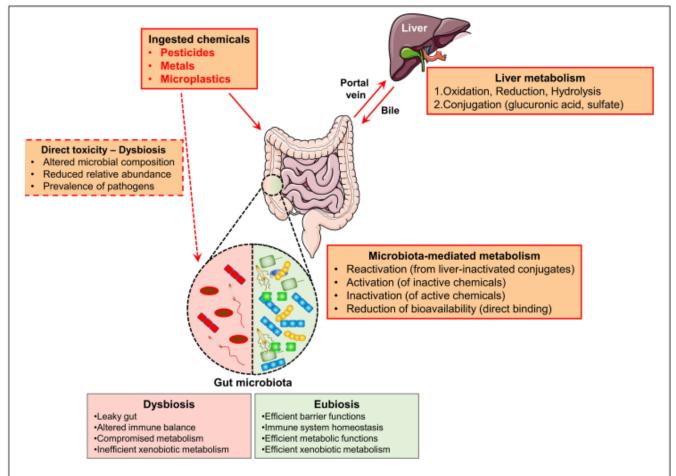


FIGURE 1 | Schematic representation of the biotransformation routes of ingested chemicals. Ingested chemicals (pesticides, metals, microplastics), arrive in the intestine through the oral route. Well-adsorbed compounds are transported to the liver through the portal vein. In the liver, such compounds may be metabolized (through the action of liver enzymes, the compounds are oxidized, reduced, or hydrolysed and finally they are conjugated) and hence released in the intestine within the bile. The gut microbes can: reactivate conjugated chemicals, directly metabolize non-adsorbed chemicals (activation or inactivation), or direct bind such compounds (reducing their bioavailability). Importantly, several chemicals might directly induce microbial dysbiosis (red dotted box). The features of a dysbiotic or eubiotic intestinal microbiota are summarized, respectively, in the red and green boxes.