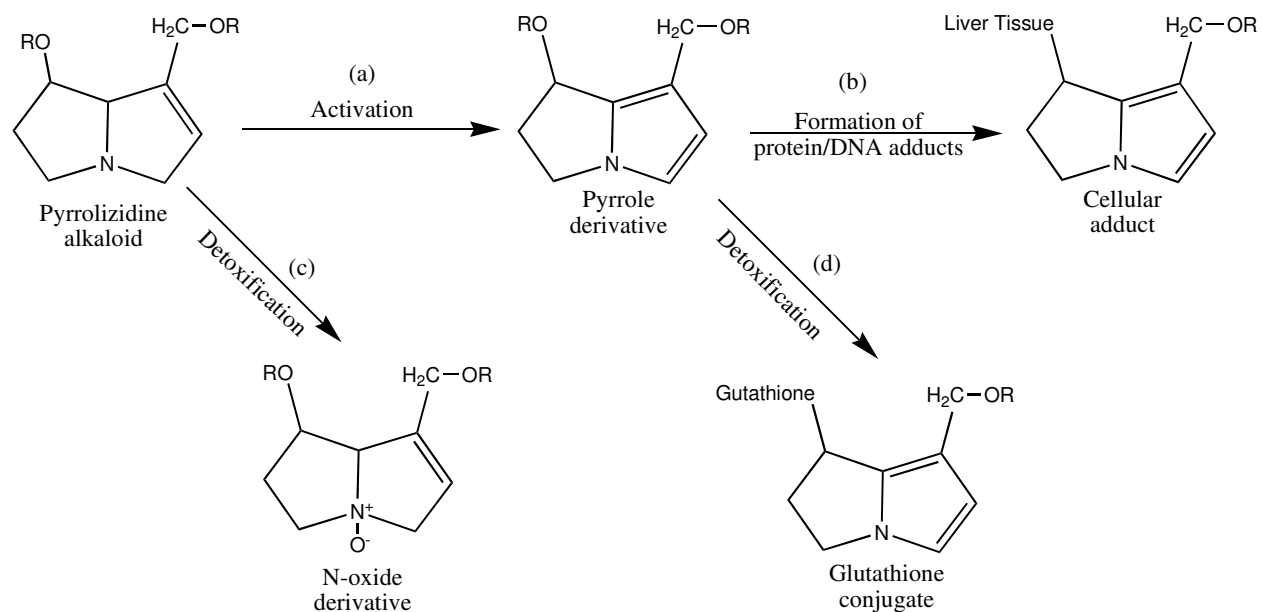


Figure 2: Activation and detoxification of pyrrolizidine alkaloids (PAs). Pyrrolizidine alkaloids are (a) dehydrogenated to produce a pyrrole intermediate, which then (b) reacts with protein or DNA to form a cellular adduct. Alternatively, detoxification occurs when the PA undergoes (c) N-oxidation or (d) the pyrrole is conjugated with glutathione.



Reprinted from: TRENDS IN PHARMACOLOGICAL SCIENCES, Vol 23, D. Rode, *Comfrey toxicity revisited*, pp 497-499, 2002 with permission from Elsevier.