

Statistical analysis in risk assessment of chemicals

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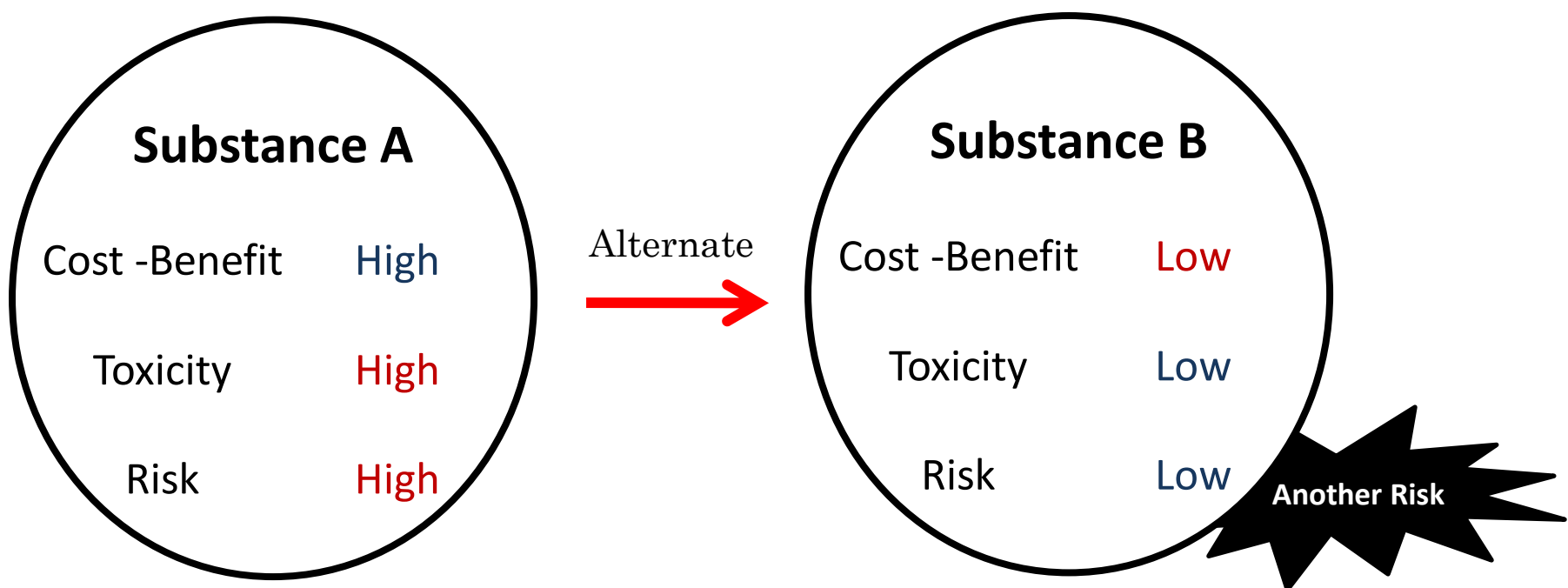
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OUTLINE

Our aim is to construct a statistical model and the inference algorithm that provide a theoretical proof for the risk assessment of chemicals. In this talk, we introduce a graphical modeling that is suitable for the representation of the causal relations with uncertainty. It becomes better combining existing statistical tools such as EM-algorithm, latent variables and so on. Our approach is challenging, but substantial progress can be made.

Risk Trade-off of Chemicals

Once we find toxicity of the substance A,



Another risk may offset the reduction in the target risk

Risk Trade-Off

In order to promote appropriate assessment and management of chemical risks, it is necessary to construct the evaluation system which makes it possible to quantify and compare the risk of the substance and its alternative.

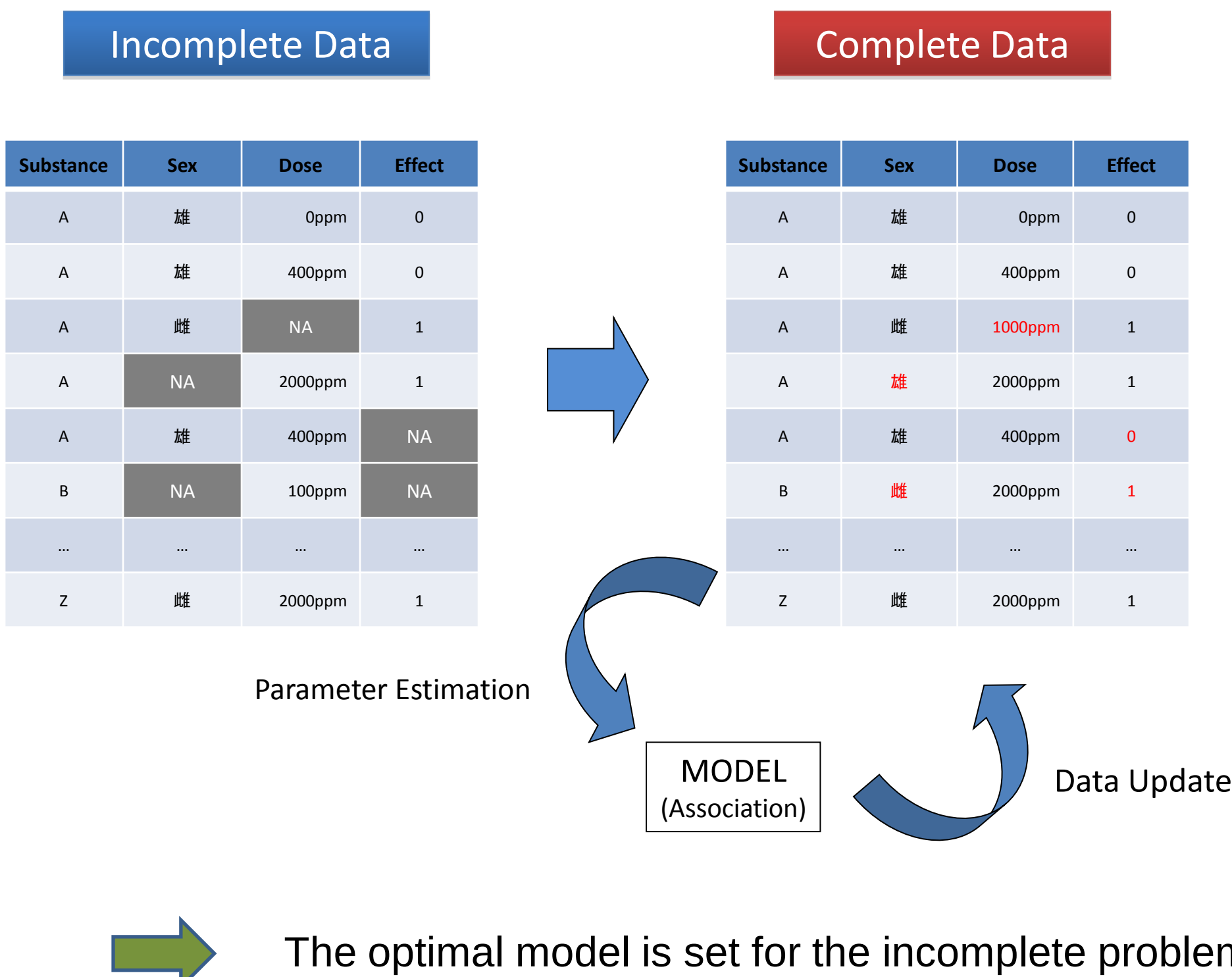
Statistical Tools

We use a graphical model to describe the relativity among the markers.

Extensions

EM algorithm is a technique for analysing the data with missing value.

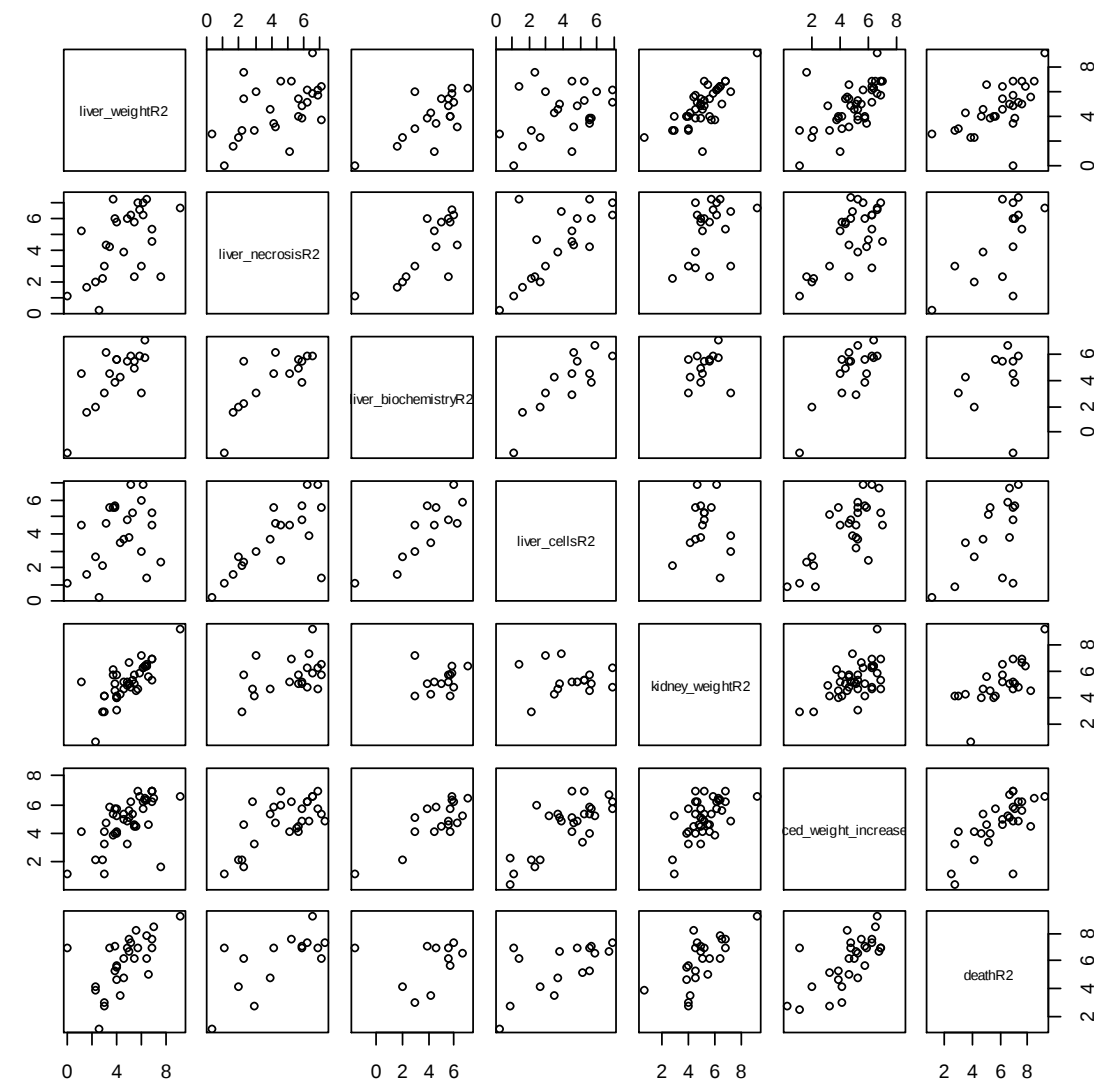
EM Algorithm



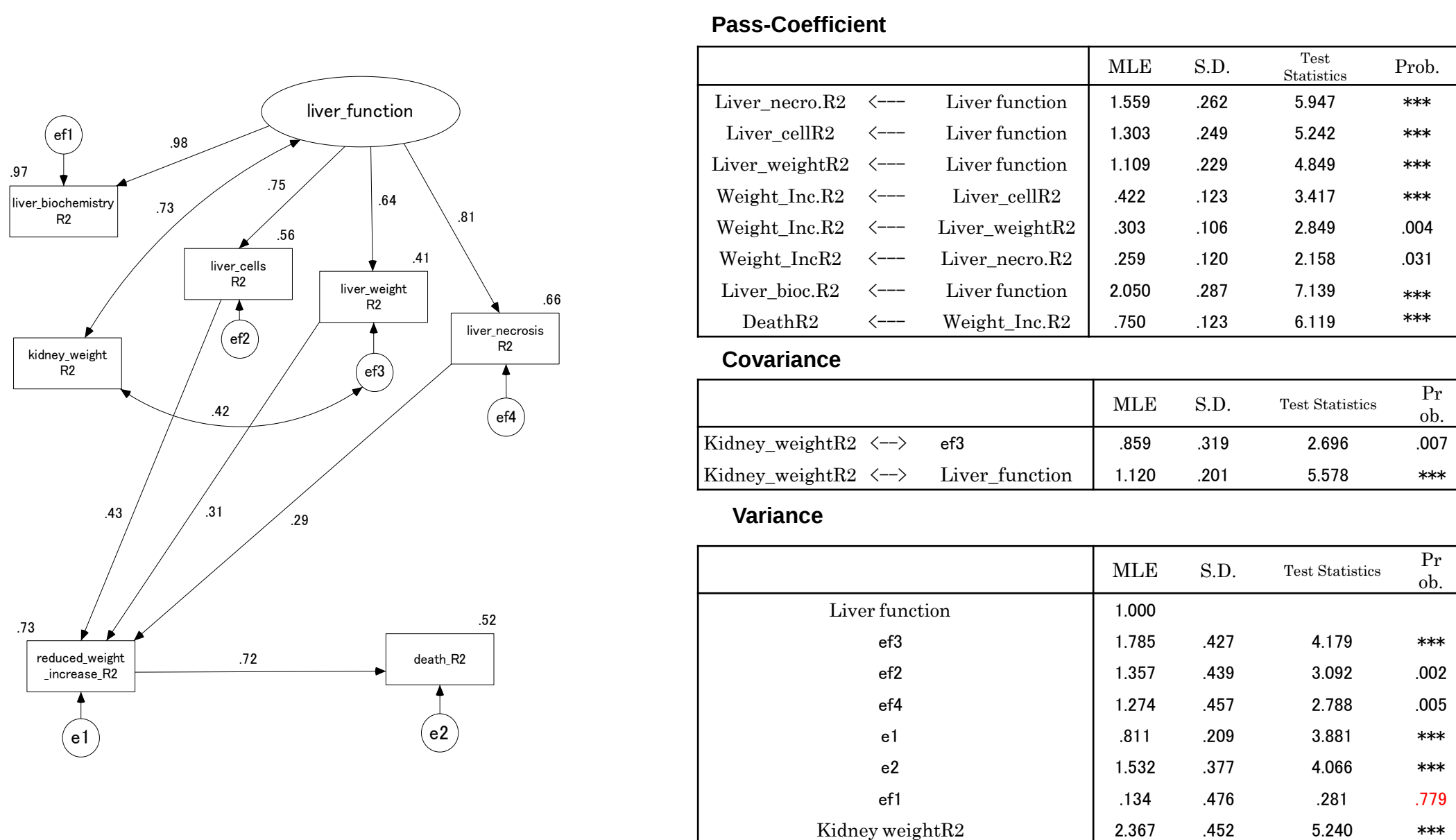
Results

The followings are some analytical Results for the chemical toxicity effect of liver and Kidney by rat's oral ingestion.

1. Scatter Plot

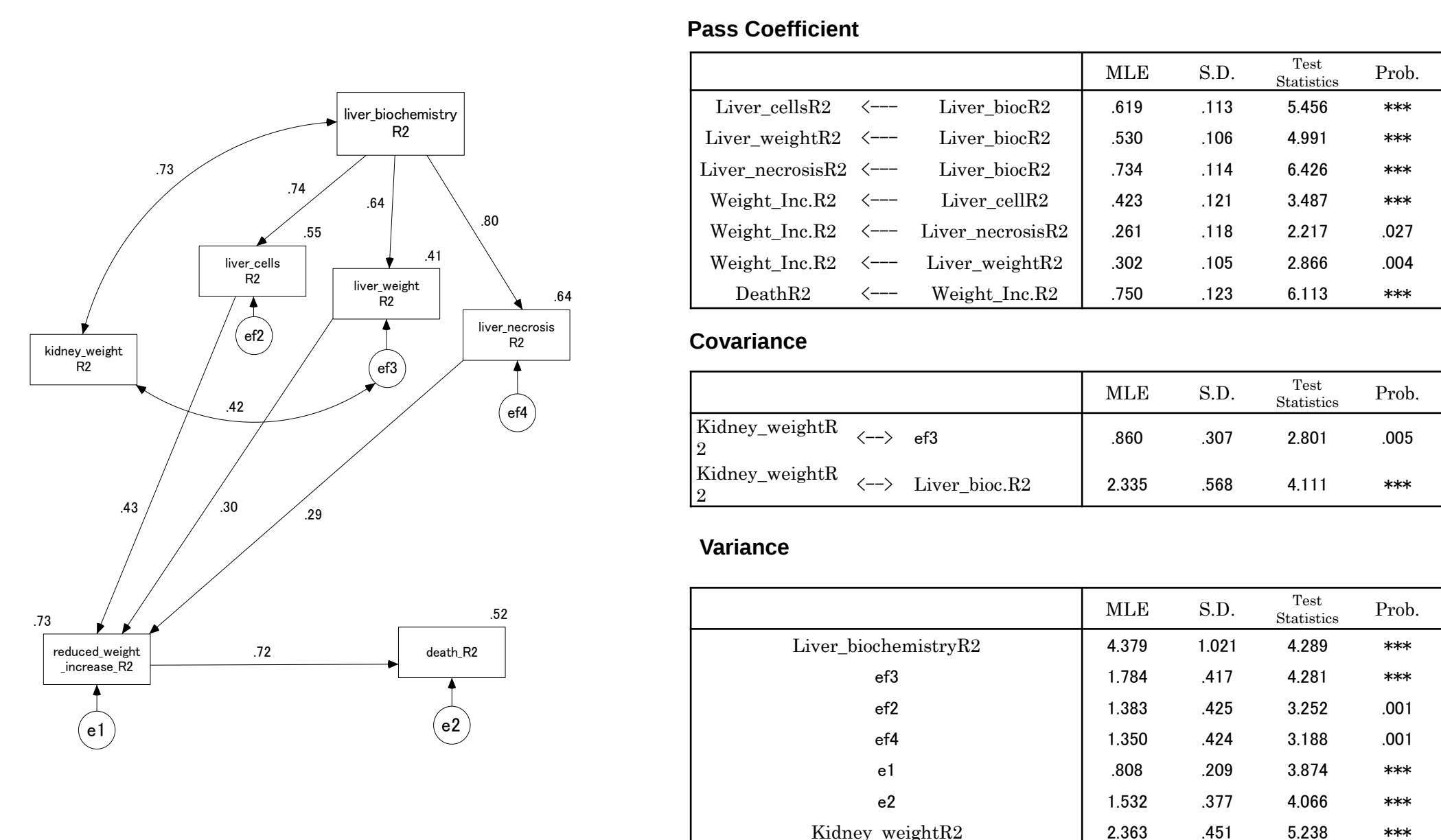


2. Latent Model (AIC=58.453)



The error variance of the liver biochemistry is not significant. Hence we propose the following model revision.

3. Revision of Model (AIC=56.523)



Acknowledgment

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