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, ....

![Risk Trade-Off Diagram](Image)

Another risk may offset the reduction in the target risk

### Results

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

1. **Scatter Plot**

![Scatter Plot Image](Image)

2. **Latent Model (AIC=58.453)**

![Latent Model Diagram](Image)

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

3. **Revision of Model (AIC=56.523)**

![Revision Model Diagram](Image)

### Acknowledgment

This work was supported by NEDO(The New Energy and Industrial Technology Development Organization) of Japan.