

# Rat Tumor Experiment

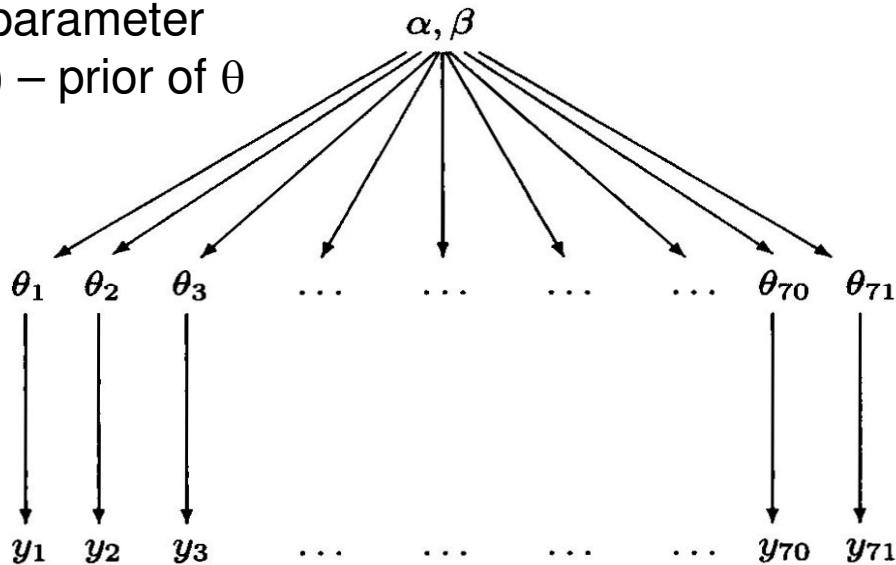
**Goal:** estimate probability of tumor in control F344 type rats

$y$  – number of rats with tumor

$n$  – total number of rats

$\theta$  – goal parameter

Beta( $\alpha, \beta$ ) – prior of  $\theta$



Previous experiments:

0/20	0/20	0/20	0/20	0/20	0/20	0/20	0/19	0/19	0/19
0/19	0/18	0/18	0/17	1/20	1/20	1/20	1/20	1/19	1/19
1/18	1/18	2/25	2/24	2/23	2/20	2/20	2/20	2/20	2/20
2/20	1/10	5/49	2/19	5/46	3/27	2/17	7/49	7/47	3/20
3/20	2/13	9/48	10/50	4/20	4/20	4/20	4/20	4/20	4/20
4/20	10/48	4/19	4/19	4/19	5/22	11/46	12/49	5/20	5/20
6/23	5/19	6/22	6/20	6/20	6/20	16/52	15/47	15/46	9/24

**Mean = 0.136      Std = 0.103**

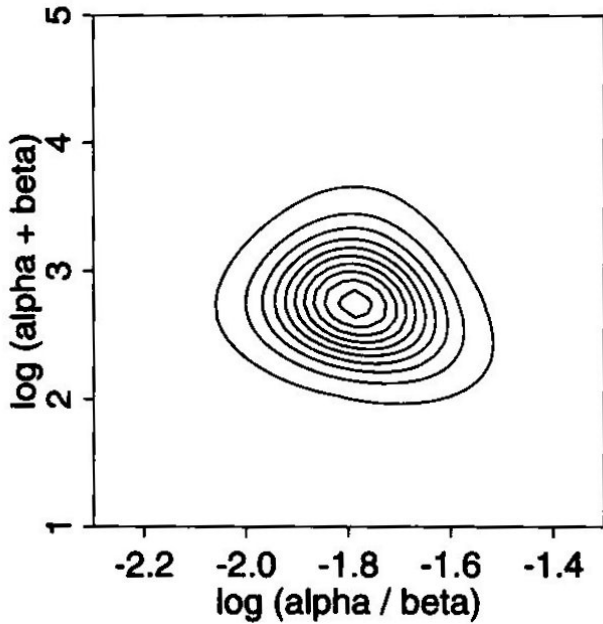
Current experiment:

4/14

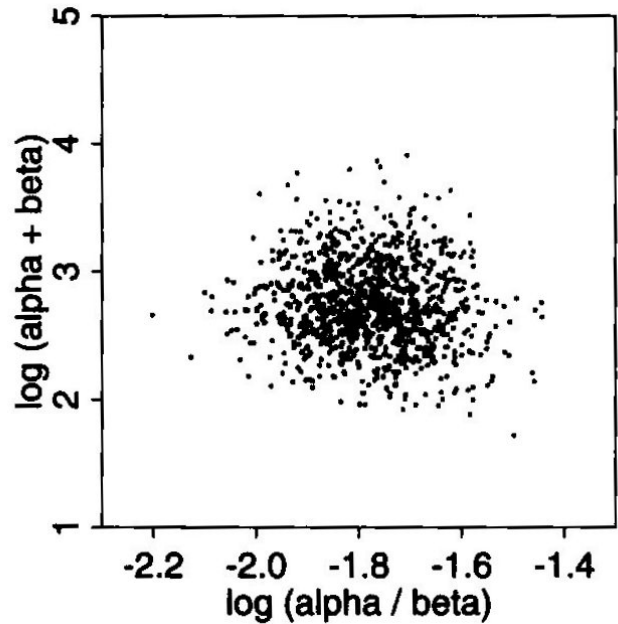
Using past mean, std we can compute  $\alpha=1.4, \beta=8.6$  which leads to  $\theta_{71}|y_{71} \sim \text{Beta}(5.4, 18.6)$  with mean 0.223 and std 0.084 (much lower than  $4/14=0.286$ )

# Rat Tumor Bayesian Analysis

Unnormalized Posterior Density



Samples from Normalized Posterior



Posterior Medians and 95% interval

