Biology 4605/7220 Name Key
Quiz #9b 17 November 2003

The General***ized*** Linear Model allows one to use non-normal errors.
Generalized Linear models are written as follows.

Identity Link: $Response = \mu + \varepsilon$

Log Link: $Response = e^{\mu} + \varepsilon$

Logit Link: $\frac{p}{1-p} = e^{\mu} + \varepsilon$

Power Link: $Response = \mu^{k} + \varepsilon$

Error is	Canonical link is
Normal	Identity
Poisson	Log
Binomial	Logit

where μ is the systematic or structural model ($\beta_o + \beta_1 X_1 + \beta_2 X_2 \ldots$ *etc*) ϵ is the error, and the canonical link is the link typically used with a particular error type.

1. Daniel (1995 *Biostatistics*) reported the following data for 150 carriers of a certain antigen, compared to 500 noncarriers, in relation to blood group.

Blood Group	Carriers	Noncarriers	Total	Odds	OR
O	72	230	302	0.313	
A	54	92	146	0.587	1.875
B	16	63	79	0.254	0.8113
AB	8	15	23	0.533	1.7037

1a Compute the odds that a person is a carrier, if their blood group is AB _____

1b Compute the odds ratio for blood group A, relative to blood group O _____

.

2 In the following example (Daniel, 1995, p559), state whether the response variable is a binomial count or a poisson count, define a symbol for the response variable and write a generalized linear model. A health department official tallies the number of cases of mumps by age group in 3 different schools.

__poisson___

$Ncases = e^{\beta_o} e^{\beta_{Grp}} e^{\beta_{Schl}} e^{\beta_{Schl*Grp}} + \varepsilon$

3 In the following example (Daniel, 1995, p558), state whether the response variable is a binomial count or a poisson count. In a survey in the inner part of a large city, 695 children under in 3 ethnic groups were classified as having hemoglobin above or below 10 g per ml.

__binomial___