**Robust statistical evaluation of tumor incidences in long-term rodent carcinogenicity studies: the reformulated poly-k trend test**

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Mortality-adjusted tumor rates in long-term carcinogenicity rodent bioassays are commonly
evaluated by means of the poly-k=3 Armitage trend test. However, this assumes exactly a linear
dose-response curve and the Weibull parameter of k=3 for all tumor sites. These unrealistic as-
sumptions can be circumvented by multiple testing across multiple possible dose-response shapes,
multiple Weibull parameters, multiple effect sizes, multiple correlated tumors as well as pairwise
and trend tests using the multiple marginal models approach. Based on data examples, differ-
ent multiple tests are demonstrated using the CRAN R packages multcomp, tukeytrend, coin,
MCPAN and multfisher.