

## Bioassays of cyclic GMP or vitamin E

K. D. MUNKRES

*University of Wisconsin, Madison*

Follow this and additional works at: <https://newprairiepress.org/fgr>



This work is licensed under a [Creative Commons Attribution-Share Alike 4.0 License](https://creativecommons.org/licenses/by-sa/4.0/).

---

### Recommended Citation

MUNKRES, K. D. (1990) "Bioassays of cyclic GMP or vitamin E," *Fungal Genetics Reports*: Vol. 37, Article 13. <https://doi.org/10.4148/1941-4765.1478>

This Regular Paper is brought to you for free and open access by New Prairie Press. It has been accepted for inclusion in Fungal Genetics Reports by an authorized administrator of New Prairie Press. For more information, please contact [cads@k-state.edu](mailto:cads@k-state.edu).

---

## Bioassays of cyclic GMP or vitamin E

### Abstract

*Age-1* mutants of *Neurospora* are conditional auxotrophs responding to cGMP or vitamin E (tocopherol). Feeding those compounds phenotypically cures their short life span and abnormal colony development. Supplement of cGMP also phenotypically cures their antioxidant enzyme deficiencies (Munkres 1990a Free Radical Bio. Med., in press). An analogous class of *Saccharomyces* mutants is doubly-deficient in two superoxide dismutase isoenzymes and, consequently, growth is inhibited by various oxidative stresses. Supplements of minute concentrations of cGMP or vitamin E permit those mutants to grow under oxidative stress (Munkres 1990b Free Radical Bio. Med.).

## Bioassays of cyclic GMP or vitamin E

*Munkres, K.D. Laboratory of Molecular Biology and Department of Genetics, The University of Wisconsin, Madison, WI 53706.*

*Age-1* mutants of *Neurospora* are conditional auxotrophs responding to cGMP or vitamin E (tocopherol). Feeding those compounds phenotypically cures their short life span and abnormal colony development. Supplement of cGMP also phenotypically cures their antioxidant enzyme deficiencies (Munkres 1990a Free Radical Bio. Med., in press). An analogous class of *Saccharomyces* mutants is doubly-deficient in two superoxide dismutase isoenzymes and, consequently, growth is inhibited by various oxidative stresses. Supplements of minute concentrations of cGMP or vitamin E permit those mutants to grow under oxidative stress (Munkres 1990b Free Radical Bio. Med.).

Dose-response analyses of the mold and yeast mutants indicate proportionality from as little as  $10(-15)$  M to optima of  $10(-12)$  M to  $10(-9)$  M with signal amplifications of 10 to 20-fold. (loc. cit. and unpublished) Those observations indicate the feasibility of development of sensitive bioassays as an economical alternative to expensive chemical assays or as tools for physiological and biochemical analyses of the function of those molecules.

The *Age-1* mutants are deposited at the Fungal Genetics Stock Center. Our recent research has used *Age-1.7* extensively. Our four yeast mutant stocks are randomly-selected, single-colony isolates from four brewer's and vintner's strains. Mutant no. 9, derived from Red Star lager brewer's yeast, is exceptionally responsive to cGMP. We will provide the yeast stocks to interested parties or the original strains may be obtained from wine and beer makers supply shops. (The other strains are Red Star Montrachet, Vierka lager and Guinness.) - - - Contribution no. 3109 from the Department of Genetics.