

# Ames test

The **Ames test** is used to **determine** the **mutagenic activity of substances** and helps to reveal the type of mutations that a certain substance causes.

## Principle

The Ames test uses special auxotrophic strains of the bacterium *Salmonella typhimurium*. These strains carry different mutations of the histidine synthesis gene (both point mutations and frameshift mutations). They can therefore only grow on a culture medium that contains the addition of this amino acid (hence the name *auxotrophic* strains). In addition, the test bacterial strains also contain other disorders, e.g. disorders in the metabolism of lipopolysaccharides, which facilitate the passage of the tested substances through the bacterial wall, or mutations in genes for repair mechanisms.

The substance to be tested for mutagenicity is added to the culture medium with a small amount of histidine. The bacterial strains used can only grow on this medium for a short time until they use up histidine. However, if a reverse mutation occurs in a bacterium and histidine synthesis is restored in it, colonies are formed after cultivation. At the same time as the test substance, an enzyme extract from rat liver can be added, which converts some test substances, which would not be mutagenic by themselves, into mutagenic metabolites.

The Ames test is one of the most widely used mutagenicity tests. It is also used to estimate the carcinogenicity of chemical substances for mammals, although the correlation between mutagenicity and carcinogenicity is not complete.

## Links

### related articles

- Mutagenesis
- Mutagens and mutagenesis
- Mutagenic and teratogenic environmental factors

### References

- KARKI, Gaurab. *Ames test - principle, procedure and application : Ames test - principle, procedure and application* [online]. ©2017. [cit. 2018-02-19]. <<http://www.onlinebiologynotes.com/ames-test-principle-procedure-and-application/>>.
- ScienceDirect. *Ames test* [online]. [cit. 2018-02-19]. <<https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/ames-test>>.