

Inhibitors (genetics)

This article has been translated from WikiSkripta; ready for the **editor's review**.

Substances that generally affect (inhibit) transcription, translation, and thus cell division.

Inhibitors can be divided according to several criteria:

1. **preferentially acting on synthesis DNA**
 - Mitomycin, Streptonigrin, Edeine...
 - main alkylating agents (bonding to N7 guanine forms a covalent bond between both chains). Mitomycin acts on the G1 phase (blocks mitosis). Streptonigrin acts on S phase. Phleomycin binds to thymine. Bleomycin cleaves the chains of single-stranded and double-stranded DNA molecules, Neocarzinostatin acts on replication enzymes.
2. **preferentially acting on RNA synthesis by interacting with DNA**
 - Actinomycin, Anthracyclines...
 - Anthracyclines: daunomycin – intercalation into the DNA chain, Olivomycin – binds to DNA.
3. **acting on RNA synthesis by interacting with RNA-polymerases**
 - Rifamycins, Streptolydigin...
 - Rifamycins – bind to the beta subunit of bacterial polymerase, Amanitins react with eukaryotic type II polymerases.
4. **acting at the precursor or regulatory level**
 - Tubercidin, a quinone antibiotic...
 - Tubercidin – inhibits RNA and DNA and proteosynthesis. Cordycepin terminates RNA synthesis (it lacks a 3'OH group). Myxophenolic acids interfere with guanine synthesis. Azaserine and DON are glutamine analogues (inhibits purine synthesis). Quinone antibiotics affect the phosphorylation of RNA precursors.

Links

Related Articles

- Transcription factors
- Translation in eukaryotes
- Translation in prokaryotes

References

- OTOVÁ, Berta. *Medical Biology and Genetics : 1st part*. 1. edition. Karolinum, 2009. ISBN 978-80-246-1594-3.