Cyanovirin- N

Drug Class: **Microbicides**

Drug Description

Cyanovirin-N, also known as CV-N, is a protein from the cyanobacterium Nostoc ellipsosporum (blue-green algae). The protein exists as either a quasi-symmetric, two-domain monomer or a domain-swapped dimer. [1]

HIV/AIDS-Related Uses

Cyanovirin-N is a potent HIV fusion inhibitor with activity against both HIV-1 and HIV-2 in vitro and in animal models.[2] It is in preclinical development as a microbicide for the prevention of sexual transmission of HIV.[3]

Non-HIV/AIDS-Related Uses

Cyanovirin-N has potent in vitro activity against almost all strains of influenza A and B virus. Cyanovirin-N is moderately active in vitro against some herpes viruses and is potentially active against hepatitis C virus.[4]

In studies in vitro and in mouse models, cyanovirin-N was active against the Zaire strain of the Ebola virus.[5]

Pharmacology

Cyanovirin-N is a protein derived from cultures of the cyanobacterium, (blue-green algae) Nostoc ellipsosporum.[6]

Cyanovirin-N binds to certain high-mannose oligosaccharides (oligomannose-8 and oligomannose-9) on viral surface envelope glycoprotein gp120, blocking its interaction with cellular receptors. This unique and effectively irreversible interaction renders gp120 incapable of mediating virus-to-cell or cell-to-cell fusion.[7] [8] Cyanovirin interacts with one sugar at a primary binding site with high affinity and to another sugar (a secondary binding site) with low affinity. In addition, cyanovirin-N appears to bind to viral oligosaccharides with high affinity and to mammalian oligosaccharides with low affinity, potentially providing potent inactivation of HIV-1 and -2 without potent adverse effects to the body.[9]

Cyanovirin-N's anti-HIV effects are expressed during the initial binding or fusion process. These effects may occur after the initial virus-to-cell attachment phase, but prior to the completion of viral entry and replication.[10]

Clinical Trials

For information on clinical trials that involve Cyanovirin-N, visit the ClinicalTrials.gov web site at http://www.clinicaltrials.gov. In the Search box, enter: Cyanovirin-N AND HIV Infections.

Dosing Information

Mode of Delivery: Intravaginal.[11]

Dosage Form: Topical gel. Preclinical studies are evaluating 0.5%, 1%, and 2% preparations in aqueous gel with hydroxyethyl cellulose.[12]

Chemistry

CAS Number: 184539-38-6[13]

Molecular weight: 11 kDa[14]

Other Names

CV-N Protein[15]

CV-N[16]

Further Reading

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Tsai CC, Emau P, Jiang Y, Agy MB, Shattock RJ, Schmidt A, Morton WR, Gustafson KR, Boyd MR. Cyanovirin-N inhibits AIDS virus infections in vaginal transmission models. AIDS Res Hum Retroviruses. 2004 Jan;20(1):11-18. PMID: 15000694

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Further Reading (cont.)

Tziveleka LA, Vagias C, Roussis V. Natural products with anti-HIV activity from marine organisms. Curr Top Med Chem. 2003;3(13):1512-35. PMID: 14529524

Manufacturer Information

Cyanovirin-N
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Suite 200
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For More Information

Contact your doctor or an AIDSinfo Health Information Specialist:

• Via Phone: 1-800-448-0440 Monday - Friday, 12:00 p.m. (Noon) - 5:00 p.m. ET

• Via Live Help: http://aidsinfo.nih.gov/live_help Monday - Friday, 12:00 p.m. (Noon) - 4:00 p.m. ET

References

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2. National Synchrotron Light Source - Newsroom: Publications-Structures of the Complexes of a Potent Anti-HIV Protein Cyanovirin-N and High-Mannose Oligosaccharides. Available at: http://www.nsls.bnl.gov/newsroom/publications/activityreport/2003/pdf/sh_life_sci_1.pdf. Accessed 2/12/08.

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9. National Synchrotron Light Source - Newsroom: Publications-Structures of the Complexes of a Potent Anti-HIV Protein Cyanovirin-N and High-Mannose Oligosaccharides. Available at: http://www.nsls.bnl.gov/newsroom/publications/activityreport/2003/pdf/sh_life_sci_1.pdf. Accessed 2/12/08.

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