DRUG NAME: Asparaginase

SYNONYMS: L-asparaginase, *Erwinia* asparaginase, *E. coli* asparaginase, Crisantaspasum[1]

COMMON TRADE NAMES: ERWINASE®, ERWINAZE® (USA), KIDROLASE®, ONCASPAR®, ASPARLAS®, RYLAZE®

CLASSIFICATION: antitumour antibiotic

Special pediatric considerations are noted when applicable, otherwise adult provisions apply.

MECHANISM OF ACTION:

Asparaginase is an enzyme that breaks down the amino acid L-asparagine by hydrolyzing L-asparagine to L-aspartic acid and ammonia. Asparagine is required for DNA synthesis and cell survival. Most normal cells are capable of synthesizing asparagine from glutamine using asparagine synthetase. However, malignant cells lack adequate levels of this enzyme and cannot survive asparagine depletion.[2-5] The oncolytic effect of asparaginase is related to sustained asparagine depletion.[5] Asparaginase is cell cycle-specific for the G1 phase.[6]

Asparaginase preparations approved for clinical use are derived from bacterial sources of either *Erwinia chrysanthemi* (ERWINASE®) or *Escherichia coli* (KIDROLASE®). Asparaginase is provided either chemically unchanged (i.e., native, non-conjugated) or conjugated to polyethylene glycol (e.g., PEG asparaginase).[2] *Erwinia*-derived asparaginase is antigenically distinct from *E. coli*-derived asparaginase, although the antineoplastic activity and toxicity is similar.[4,5] Different formulations are subject to availability.

Comparison table of asparaginase products by source and availability

***E. coli*-derived Asparaginase**	
Asparaginase (KIDROLASE)	withdrawn from Canadian market
Pegaspargase (ONCASPAR)	pegylated conjugate of E. coli-derived asparaginase (attached to polyethylene glycol)
Calaspargase pegol (ASPARLAS)	pegylated conjugate of E. coli-derived asparaginase (attached to monomethoxy-polyethylene glycol)
***Erwinia chrysanthemi*-derived Asparaginase**	
Asparaginase-erwinia (ERWINASE)	withdrawn from Canadian market
Crisantaspase recombinant (RYLAZE)	recombinant asparaginase (identical to *Erwinia chrysanthemi*-derived asparaginase)

Refer to individual Cancer Drug Manual monographs for Calaspargase pegol, Crisantaspase recombinant, and/or Pegaspargase for more information about asparaginase. (see Drug Index)

REFERENCES:

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2. Vieira Pinheiro JP. The best way to use asparaginase in childhood acute lymphatic leukaemia - still to be defined? Br J Haematol 2004;125:117-127
3. Shire Pharma Canada-ULC. ONCASPAR® product monograph. Toronto, Ontario; April 20 2018
4. Blamble D. Asparaginase products: a review of three agents' indications, dosing and toxicities. HemOnc Today 2012
5. CGF Pharmatec for Jazz Pharmaceuticals France SAS. ERWINASE® product monograph. Montreal, Quebec; August 30 2016
6. Lexi-Drugs® (database on the Internet). Asparaginase (Erwinia). Lexi-Comp Inc., 2020. Available at: http://online.lexi.com. Accessed March 19, 2020

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