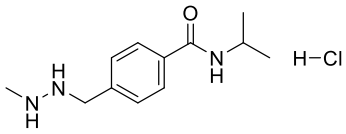
Product data sheet

MedKoo Cat#: 100760 Name: Procarbazine HCl CAS#: 366-70-1 (HCl) Chemical Formula: $C_{12}H_{20}ClN_3O$ Exact Mass: 221.15281 Molecular Weight: 257.76	
Product supplied as:	Powder
Purity (by HPLC):	≥ 98%
Shipping conditions	Ambient temperature
Storage conditions:	Powder: -20°C 3 years; 4°C 2 years.
	In solvent: -80°C 3 months; -20°C 2 weeks.

1. Product description:
Procarbazine is an antineoplastic chemotherapy drug for the treatment of Hodgkin's lymphoma and certain brain cancers (such as glioblastoma multiforme). It is a member of a group of medicines called alkylating agents. The drug is metabolized and activated in the liver. It also inhibits MAO thus increasing the effects of sympathomimetics, TCAs, and tyramine. It gained FDA Approved in July 1969. It is on the World Health Organization's List of Essential Medicines, a list of the most important medication needed in a basic health system.

2. CoA, QC data, SDS, and handling instruction
SDS and handling instruction, CoA with copies of QC data (NMR, HPLC and MS analytical spectra) can be downloaded from the product web page under "QC And Documents" section. Note: copies of analytical spectra may not be available if the product is being supplied by MedKoo partners. Whether the product was made by MedKoo or provided by its partners, the quality is 100% guaranteed.

3. Solubility data

Solvent	Max Conc. mg/mL	Max Conc. mM
DMSO	25.0	97.0
Ethanol	2.0	7.8

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	3.88 mL	19.40 mL	38.80 mL
5 mM	0.78 mL	3.88 mL	7.76 mL
10 mM	0.39 mL	1.94 mL	3.88 mL
50 mM	0.08 mL	0.39 mL	0.78 mL

5. Molarity Calculator, Reconstitution Calculator, Dilution Calculator
Please refer the product web page under section of "Calculator"

6. Recommended literature which reported protocols for in vitro and in vivo study
In vitro study

1. Goria-Gatti L, Iannone A, Tomasi A, Poli G, Albano E. In vitro and in vivo evidence for the formation of methyl radical from procarbazine: a spin-trapping study. Carcinogenesis. 1992 May;13(5):799-805. doi: 10.1093/carcin/13.5.799. PMID: 1316811.

In vivo study

1. Revollo J, Bhalli JA, Tebbe C, Noteboom J, Thomas D, McKinzie P, Felton N, Pearce MG, Dobrovolsky VN. Spectrum of Pig-a mutations in T lymphocytes of rats treated with procarbazine. Mutagenesis. 2017 Dec 31;32(6):571-579. doi: 10.1093/mutage/gex032. PMID: 29237063.

2. Maurice C, Dertinger SD, Yauk CL, Marchetti F. Integrated In Vivo Genotoxicity Assessment of Procarbazine Hydrochloride Demonstrates Induction of Pig-a and LacZ Mutations, and Micronuclei, in MutaMouse Hematopoietic Cells. Environ Mol Mutagen. 2019 Jul;60(6):505-512. doi: 10.1002/em.22271. Epub 2019 Jan 18. PMID: 30592561; PMCID: PMC6618172.

7. Bioactivity

Product data sheet

Biological target:

Procarbazine Hydrochloride is an alkylating agent, with anticancer activity.

In vitro activity

Electron spin resonance (ESR) analysis combined with the use of 4-pyridyl-1-oxide-t-butyl nitrone (4-POBN) and dibromonitroso benzenesulfonic acid (DBNBS) as spin-trapping agents was used to characterize free radical generation during the metabolism of the anticancer agent procarbazine [N-isopropyl-a-(2-methylhydrazino)-p-toluamide hydrochloride]. The formation of free radical species, identified as methyl radicals, was observed during oxidation of procarbazine in rat liver microsomes and isolated hepatocytes in vitro. The metabolic pathway leading to free radical formation was characterized using various procarbazine metabolites and revealed strict analogies with previously published data on methane production from procarbazine. These results supported the identification of the trapped species as methyl free radical and suggested that C-oxidation of azoprocarbazine is the main source of radical intermediates derived from this anticancer drug.

Reference: Carcinogenesis. 1992 May;13(5):799-805. https://academic.oup.com/carcin/article-lookup/doi/10.1093/carcin/13.5.799

In vivo activity

Flow cytometry-based erythrocyte and T lymphocyte assays were employed in order to quantify the frequencies of cells deficient in glycosylphosphatidyl inositol-anchored surface markers CD59 and CD48 (presumed mutants in the endogenous X-linked Pig-a gene) in rats. The rats were treated once daily with 100 mg/kg procarbazine HCl for 3 days. In addition, we sorted mutant-phenotype spleen T cells and immediately analysed their Pig-a gene using next generation sequencing of dual-indexed multiplex libraries and error-correcting data filtering. More than 100-fold increase in the frequencies of CD59-deficient RBCs was observed at Day 29 after the last administration, and a 10-fold increase in the frequency of CD48-deficient T cells was observed at Days 45 to 50. Sequencing revealed that, in T cells from procarbazine-treated rats, mutations in the Pig-a gene occurred predominantly at A:T basepairs when A was located on the non-transcribed DNA strand. A→T transversion was the most common mutation. The results suggest that, at least for the transcribed X-linked Pig-a gene, in vivo methyl guanine adducts are not the major contributors to mutations induced by procarbazine.

Reference: Mutagenesis. 2017 Dec 31;32(6):571-579. https://academic.oup.com/mutage/article-lookup/doi/10.1093/mutage/gex032