

Alkaloids from *Catharanthus roseus* – Remedy for cancer

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The rosy periwinkle (*Catharanthus roseus*) is native only to the tropical forests of Madagascar, the world's fourth largest island, found off the east coast of Africa. When researchers began to analyse the plant in the 1950's they discovered it contained over 70 alkaloids. Some were found to lower blood sugar levels and others to act as hemostatics, but the most interesting were vinblastine and vincristine, which were found to lower the number of white cells in blood. A high number of white cells in the blood indicates leukemia. So a new anti-cancer drug had been discovered. Vinblastine has helped increase the chance of surviving childhood leukaemia from 10% to 95%, while vincristine is used to treat Hodgkins' Disease. Traditional Madagascan healers used the rosy periwinkle for treating diabetes. This led to its study by western scientists who then discovered its anti-cancer properties. These medicines have proved very profitable for global drug companies. Worldwide sales are worth over £75 million a year, but virtually none of this money finds its way back to Madagascar, one of the poorest countries in the world. Recent international agreements have tried to ensure that more profits from the commercial development of animal and plant species return to the countries of origin.

Key words :

Catharanthus roesus, Cander, *Rosy periwinkle*

Rosy periwinkle:

Catharanthus roseus (Madagascar Periwinkle) is a species of *Catharanthus* belonging to family Apocynaceae native and endemic to Madagascar. Synonyms include *Vinca rosea* (the basionym), *Ammocallis rosea*, and *Lochnera rosea*; other English names occasionally used include Cape Periwinkle, Rose Periwinkle, Rosy Periwinkle, and "Old-maid".

It is an evergreen subshrub or herbaceous plant growing to 1 m tall. The leaves are oval to oblong, 2.5–9 cm long and 1–3.5 cm broad, glossy green, hairless, with a pale midrib and a short petiole 1–1.8 cm long; they are arranged

in opposite pairs. The flowers are white to dark pink with a darker red centre, with a basal tube 2.5-3 cm long and a corolla 2–5 cm diameter with five petal-like lobes. The fruit is a pair of follicles 2–4 cm long and 3 mm broad.

Alkaloids of rosy periwinkle:

Following are different alkaloids found in rosy periwinkle:

- Vincristine,
- Vinblastine
- Reserpine
- Ibogaine
- Yohimbine
- Raubasine

Out of these Vincristine and Vinblastine are mostly used.

Vincristine :

Vincristine (brand name, Oncovin), also known as leurocristine, is a vinca alkaloid from the *Catharanthus roseus* (Madagascar periwinkle), formerly *Vinca rosea* and hence its name. It has molecular formula as $C_{46}H_{56}N_4O_{10}$. It is a mitotic inhibitor, and is used in cancer chemotherapy. Vincristine is a colourless fluid.



Mode of action:

Tubulin is a structural protein which polymerises to form microtubules. The cell cytoskeleton and mitotic spindle, amongst other things, are made of microtubules. *Vincristine* binds to tubulin dimers, inhibiting assembly of microtubule structures. Disruption of the microtubules arrests mitosis in metaphase. The

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