113.3.3 Antiasthmatic and Antitussive Activity

Oxymatrine has been used as an antiasthmatic agent when administered orally. A pharmacokinetic study showed that, after intramuscular injection of oxymatrine into rats, oxymatrine appeared at high concentrations in the tissues, bile, and urine. In contrast, when oxymatrine was given orally, concentrations of matrine exceeded those of oxymatrine in all samples, indicating that oxymatrine was converted to matrine. Intravenous injection of oxymatrine was ineffective against experimental asthma in guinea pigs, whereas oral administration of oxymatrine relieved asthma symptoms. Matrine is probably the pharmacologically active metabolite for asthma treatment arising from oxymatrine. In healthy volunteers given 100 mg oxymatrine orally, about 40% of the dose was excreted in the urine, 13%–33% representing oxymatrine [42, 43].

The metabolism of sophocarpine has also been studied. Sophocarpine is well absorbed from the gastrointestinal tract. Distribution in different organs after oral administration was similar to that after i.v. or i.m. administration with some delay in appearance of maxima. Sophocarpine was eliminated mainly via the renal route [44].

Sophocarpine, sophocarpine hydrobromide, and the aqueous extract of *S. alopeculoides* all showed antitussive activity. This action has been reported to be mediated via the central β-receptors [45]. Flavones and related compounds of *S. flavescens*, including kushenol A, kurarinone, and kuraridin, showed inhibitory activity on cAMP phosphodiesterase. The prenyl group in the structure has been found to be important for high inhibitory activity. Kinetic study revealed that norkurarinone, kurarinol, and kuraridin noncompetitively inhibited cAMP phosphodiesterase [46]. The antiinflammatory and antiallergic action of aloperine was also reported [47].

113.3.4 Antineoplastic Activity

Matrine and oxymatrine exhibited significant antitumor activity against sarcoma 180, and matrine also showed antitumor activity against Ehrlich ascites tumor in mice [19].

Sophocarpine moderately inhibited the transplanted tumors S180, U14, Lio-1, Walker 256, and L615. When sophocarpine was given i.p. to mice inoculated with S180 ascites sarcoma, Ehrlich ascites carcinoma, or Walker 256, mitotic indices of cancer cells were moderately or slightly reduced. When normal or tumor-bearing mice were given sophocarpine intragastrically at 24 mg/kg daily for 10 days, RNA and DNA contents in the tumor and spleen were decreased slightly. In dogs given sophocarpine orally at a dose of 45 mg/kg, mild thrombopenia was observed. No significant changes in immune activity in mice were caused by sophocarpine treatment [48, 49]. RNA and DNA contents in Ehrlich ascites tumor cells of mice were decreased by 7%–9% and 20–30%, respectively, following administration of 60–120 mg/kg sophocarpine. Sophocarpine treatment also inhibited the incorporation of [^{3}H]thymidine into tumor cell DNA by 21%–34% [50].

In contrast, matrine showed immunosuppressive activity in vivo. Murine spleen cell proliferation and interleukin 2 formation were reduced by 50% in culture at fairly high concentrations of matrine (0.6 and 0.1 mg matrine/ml, respectively) [51].