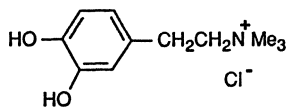
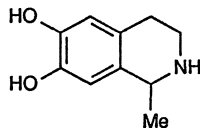


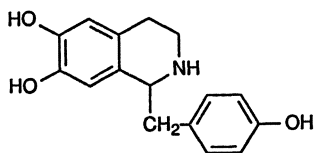
heart stimulants, diuretics, and analgesic agents, higenamine (3-98) and yokonoside (3-99) [76, 77], were isolated and identified.



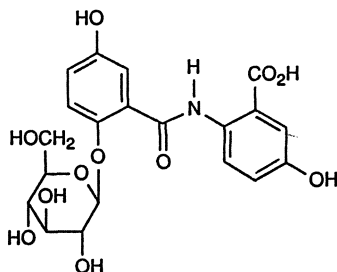
Coryneine chloride (3-96)



Salsolinol (3-97)



Higenamine (3-98)



Yokonoside (3-99)

Recently, the isolation and determination of certain glycans, namely, aconitans A, B, C, and D, from the roots of *A. carmichaeli* were reported by Konno et al. [78]. Gel chromatography of aconitans A, B, C, and D over Sephacryl S-200 or S-300 gave molecular weights of approximately  $8.2 \times 10^3$ ,  $2.1 \times 10^5$ ,  $4.3 \times 10^3$ , and  $4.2 \times 10^4$ , respectively. The glycans contain a neutral sugar, an acidic sugar (aconitan C), and a peptide moiety in different molar ratios. The neutral sugar components were glucose for aconitan A and rhamnose, arabinose, mannose, galactose, and glucose, with a molar ratio of 0.6:0.1:2.3:1.0:1.2 for aconitan B and 1.1:1.0:0.2:1.0:0.8 for aconitan C. Aconitan D contains rhamnose, arabinose, galactose, and glucose with a molar ratio of 0.4:0.6:1.0:0.3. Aconitan A is composed of  $\alpha$ -(1 $\rightarrow$ 6)-linked D-glucopyranose molecules with three branching points at O-3 [79].

### 3.3 Pharmacology

#### 3.3.1 Toxicity

After i.v. injection into mice, the acute LD<sub>50</sub> values of aconitine, mesaconitine, beiwutine, hypaconitine, 3-acetylaconitine, and deoxyaconitine were 0.22, 0.27, 0.42, 0.50, 1.01, and 1.90 mg/kg, respectively [80]. In subacute toxicity tests, rats treated with aconite root extract and mesaconitine at daily doses of 1.1 g/kg and 1.3 mg/kg, respectively, died within 3–6 days. In mice, aconite root extract at a daily dose of 800 mg/kg caused a decrease in the number of erythrocytes and in the serum levels of total protein and albumin [81]. In subchronic toxicity tests, a decrease in body weight was observed in rats treated with mesaconitine at a daily dose of 0.4 mg/kg. Glutamic-oxalacetic transaminase and lactate dehydrogenase levels also decreased in animals treated with raw or processed aconite roots at daily doses of 0.08–0.32