

made to perpetuate the trisomic cell line, by injecting new-born anaemic mice with a suspension of cells prepared from this spleen after surgical removal. Unfortunately, these mice died shortly after the injection. None of the 5 mice had any obvious abnormality or malformation, and all were healthy at the time of sacrifice.

In the 4 previously reported cases of autosomal trisomy in the mouse the chromosome aberration was almost certainly induced; by a chemical mutagen on the one hand¹ and by irradiation on the other². In the present work, no such treatment was knowingly involved, and it presumably arose spontaneously¹⁰.

Résumé. En utilisant le chromosome T6 pour des expériences de transplantations dans la souris, nous avons

trouvé des cellules contenant 41 chromosomes et le trisomique pour le chromosome T6.

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Flavonoids of *Arctium minus* (Compositae)

Arctium minus (Hill) Bernh. (Compositae; Cynareae), or 'burdock', occurs commonly beside roadways and in waste areas in British Columbia. As part of our study of phenolic compounds in Compositae we undertook an examination of this species for flavonoids. NAKABAYASHI¹ found chlorogenic acid, isochlorogenic acid, and caffeic acid in *A. lappa* but could detect no 'flavonols'. Rutin and hyperin were found in the leaves of *A. tomentosum* and *A. leiospermum* by Russian workers².

The ethanol extract (70%) of *A. minus* was subjected to fractionation on a polyamide column (Polyclar AT) using water and then water with increasing concentrations of ethanol as eluant. The fractions were purified further through paper chromatography using several solvent systems (see footnote to Table). Two major flavonoids and 5 minor constituents were observed. The 2 major constituents gave quercetin (3,3', 4', 5,7-pentahydroxyflavone) on acid hydrolysis. One gave only glucose, the other gave rhamnose and glucose in 1:1 ratio. Ultraviolet data indicated that glycosylation at position 3 was present in each compound. The compounds were identified through co-chromatography as isoquercitrin (quercetin-3-*o*-glucoside) and rutin (quercetin-3-*o*-rhamnoglucoside).

Two of the minor flavonoids gave kaempferol (3,4', 5,7-tetrahydroxyflavone) on acid hydrolysis. The compounds gave sugar analyses as above and were identified as kaempferol-3-*o*-glucoside (astragalin) and kaempferol-3-*o*-rhamnoglucoside.

The 3 remaining compounds all gave quercetin after acid hydrolysis. One exhibited spectral and colour

characteristics of a 7-*o*-glycoside and gave only glucose on acid hydrolysis. It was tentatively identified as quercetin-7-*o*-glucoside (quercimeritrin). The other 2 minor constituents gave 1 equivalent of glucose and arabinose, respectively, with glycosylation at position 3 determined by spectral tests. These compounds are considered to be quercetin-3-*o*-glucoside and quercetin 3-*o*-arabinoside. The former would appear to be an isomer of isoquercitrin, one of the major constituents.

The phenomenon of isomeric glycosides has been recorded for other flavone derivatives. Thus, 2 apigenin-7-*o*-glucosides were found in *Matricaria chamomilla* which differed only in their R_f values³. Quercetin-3-*o*-arabinosides having different physical properties have also been found in nature^{4,5}. R_f values for the compounds described above appear in the Table.

Zusammenfassung. Die hauptsächlichen Flavonoide aus *Arctium minus* (Compositae) sind Isoquercetrin und Rutin. Zusätzliche Flavonoide sind Kaempferol-3-*o*-Glukosid und 3-*o*-Rhamnoglukosid, Quercetin-7-*o*-Glukosid, 3-*o*-Arabinosid und ein 3-*o*-Glukosid das mit Isoquercetrin isomer ist.

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R_f values of isolated flavonol glycosides

	BAW ^a	PhOH ^c	15% ^a
quercetin-3-glucoside	0.55	0.33	0.50
quercetin-3-glucoside*	0.29	0.54	0.15
quercetin-3-arabinoside	0.57	0.35	0.39
quercetin-7-glucoside	0.17	0.21	0.10
quercetin-3-rhamnoglucoside	0.33	0.29	0.60
kaempferol-3-glucoside	0.62	0.65	0.54
kaempferol-3-rhamnoglucoside	0.44	0.55	0.66

* Isomeric glucoside. ^a *n*-butanol:acetic acid: water (4:1:5). ^c Phenol: water (80:20). ^d Acetic acid: water (15:85).

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