8 D.B. Roberts, J. Wolfe and M.E. Akam, J. Insect Physiol. *23*, 871 (1977).
9 B.G. Loughton and A.S. West, J. Insect Physiol. *11*, 919 (1965).
10 G.M. Chippendale and B.A. Kilby, J. Insect Physiol. *15*, 905 (1969).
11 P.S. Chen and L. Levenbook, J. Insect Physiol. *12*, 1595 (1966).
12 J.A. Thomson, K.R. Radok, D.C. Shaw, M.J. Whitten, G.G. Foster and L.M. Birt, Biochem. Genet. *14*, 145 (1976).
13 S.J. Kramer, E.C. Mundall and J.H. Law, Insect Biochem. *10*, 279 (1980).
14 J.F. Kinnear, M.D. Martin and J.A. Thomson, Aust. J. biol. Sci. *24*, 275 (1971).
15 J.D. Sato, D. phil. thesis, Oxford University, Oxford 1980.
16 S. Tojo, T. Betchaku, V.J. Ziccardi and G.R. Wyatt, J. Cell Biol. *78*, 823 (1978).
17 K.L. Williams and L.M. Birt, Insect Biochem. *2*, 305 (1972).
18 S.O. Andersen, A. Rev. Ent. *24*, 29 (1979).
19 J.G. Kunkel and D.M. Lawler, Comp. Biochem. Physiol. *47B*, 697 (1974).
20 G.M. Price, Biol. Rev. *48*, 333 (1973).
21 D.B. Roberts and S.M. Evans-Roberts, Genetics *93*, 663 (1979).
22 H.W. Brock and D.B. Roberts, Eur. J. Biochem. *106*, 129 (1980).
23 S. Izumi, S. Tojo and S. Tomino, Insect Biochem. *10*, 429 (1980).
24 C.E. Sekeris, R. Perassi, J. Arnemann, A. Ullrich and K. Scheller, Insect Biochem. *7*, 529 (1977).
25 A. Alonso, C.N. Flytzanis, U. Schatzle, K. Scheller and C.E. Sekeris. Eur. J. Biochem. *94*, 601 (1979).
26 D.F. Smith, A. McLelland, B.N. White, C.F. Addison and D.M. Glover, Cell in press (1981).
27 J.L. Hubby and R.C. Lewontin, Genetics *54*, 577 (1966).
28 D.J. Kemp, J.A. Thomson, W.J. Peacock and T.J.V. Higgins, Biochem. Genet. *16*, 355 (1978).
29 M.E. Akam, D.B. Roberts and J. Wolfe, Biochem. Genet. *16*, 101 (1978).
30 N. Kleckner, Cell *11*, 11 (1977).
31 B. Bowen, J. Steinberg, U.K. Laemmli and H. Weintraub, Nucl. Acid. Res. *8*, 1 (1980).
32 H. Towbin, T. Staehlin and J. Gordon, Proc. natl Acad. Sci. USA *76*, 4350 (1979).
33 Z. Srdic, H. Beck and H. Gloor, Experientia *34*, 1572 (1978).
34 F.Lemeunier and M. Ashburner, Proc. R. Soc. B *193*, 275 (1976).
35 A.H. Sturtevant and C.C. Tan, J. Genet. *34*, 415 (1937).
36 D.B. Roberts and S.M. Evans-Roberts, Nature *280*, 691 (1979).
37 D.B. Roberts and S.M. Evans-Roberts, Molec. gen. Genet. *148*, 57 (1976).
38 C.E. Sekeris and K. Scheller, Dev. Biol. *59*, 12 (1977).
39 M. Ashburner, Chromosoma *21*, 398 (1967).
40 S. Tojo, M. Nagata and M. Kobayashi, Insect Biochem. *10*, 289 (1980).

SPECIALIA

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Desacetylscalaradial, a cytotoxic metabolite from the sponge *Cacospongia scalaris*

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Summary. From the marine sponge *Cacospongia scalaris*, scalaradial **1**, desacetylscalaradial **2**, and heteronemin **3** were isolated. Compound **2** showed potent cell growth inhibition. The stereochemistry of **3** is briefly discussed.

Sponge material (collected at Wakayama) frozen with dry ice, was immersed in dichloromethane. Reverse phase chromatography (LiChroprep RP-18/MeOH) of the dichloromethane layer, which showed mainly 2 spots (dialdehyde components **1** and **2**; $R_f = 0.20$ and 0.25, respectively) under UV light on TLC plate, resulted in a change of both spots which made them undetectable by UV light (cyclic dimethylacetal **4** and **5**; $R_f = 0.40$ and 0.47, respectively). Further chromatography of **4** and **5** resulted in separation of each into 2 epimers (**4a, 4b** and **5a, 5b,** respectively). Treatment of either **4a** or **4b** in dichloromethane with hydrochloric acid gave a dialdehyde, which proved to be scalaradial **1,** a metabolite from the sponge *C. mollior*[2,3], based on its spectra. Inferring that formation of cyclic dimethylacetals from dialdehyde was catalysed by a trace amount of acid remaining on the RP-18 support during reverse phase chromatography, we treated **1** with ion exchange resin (acid form) in methanol. As expected, cyclic dimethylacetals **4a** and **4b** were formed.

The structure of the cyclic dimethylacetal was examined first for the major products **4a** and **4b**. Interpretation of their spectra (table) suggested that the difference between them was only the orientation of the 19-MeO group. The stereochemistry of the cyclic dimethylacetal part depicted as **4a** and **4b** was deduced by ^{1}H-NMR spin decoupling[2,4]. On irradiation of the 20-H signal, the 16-H signal remained unchanged (i.e., the angle between allylic 16-H and 20-H was near 0°). Irradiation of 15-H signal caused 16-H signal to collapse to a doublet ($/J/ = 3.0$ Hz, i.e., the angle between 16-H and allylic 18-H was near 90°), and irradiation of 18-H caused 16-H to change into a triplet ($J = 3.5$ Hz). The J value of 19-H indicated β orientation of

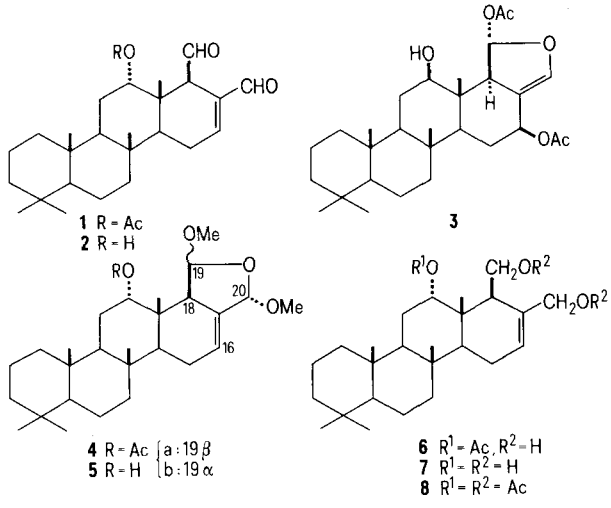
	1	2	4a	4b	5a	5b
Melting point	-	199–201 °C	142–143 °C	177–178 °C	211–213 °C	199–201 °C
IR ($CHCl_3$) cm^{-1}	-	3540	-	-	3525	3525
	2730, 1728	2730, 1712	1723	1730	-	-
	1685, 1650	1680, 1645				
HR-MS (m/e)	(428: M^+)*	(386: M^+)*	(474: M^+)*		(432: M^+)*	
	368 (M-AcOH)	368 (M-H_2O)	442 (M-MeOH)		400 (M-MeOH)	
	400 (M-CO)	358 (M-CO)	441 (M-60) or (M-AcOH)		372 (M-60)	
					357 (M-60-Me)	
	340 (M-CO-AcOH)	340 (M-CO-H_2O)	354 (M-60-AcOH)		340 (M-60-MeOH)	
	258 (D-ring ≀≀-AcOH)	275 (D-ring ≀≀)	339 (354-Me)		339 (357-H_2O)	
	205, 191, 177, 163, 149	205, 191, 177, 163, 149	201, 191, 162, 149, 135		275 (D-ring ≀≀) 205, 191, 136	
^{1}H-NMR δ ($CDCl_3$)						
12-H	4.77 ($W_{H_{1/2}}$ ~8 Hz)	3.61 ($W_{h_{1/2}}$ ~7 Hz)	4.91 (t-like)	4.82 (t-like)	3.70	3.75
15-H	2.40	2.40	~2.0	~2.0	~2.1	~2.1
16-H	7.07	7.08	5.75	5.72	5.77	5.79
18-H	3.50	3.46	2.97	2.82	3.08	2.98
19-H	9.53 (d, J=4.0 Hz)	9.57 (d, J=5.0 Hz)	4.82 (d, J=3.5 Hz)	4.85 (d, J=6.0 Hz)	4.97 (d, J=4.5 Hz)	5.03 (d, J=7.0 Hz)
20-H	9.47 (s)	9.49 (s)	5.13 ($W_{H_{1/2}}$ ~3 Hz)	5.40 ($W_{H_{1/2}}$ ~4 Hz)	5.22 ($W_{H_{1/2}}$ ~3 Hz)	5.51
MeO	-	-	3.40, 3.37	3.44, 3.39	3.51, 3.40	3.58, 3.46
AcO	2.13	-	2.05	2.04	-	-
Me's	0.97, 0.85, 0.80	0.95, 0.89, 0.83, 0.81	0.91, 0.86, 0.81, 0.76	0.92, 0.87, 0..85, 0.81	0.90, 0.82, 0.75	0.92, 0.82

* M^+ was not observed.

19-MeO in **4a** (J=3.5 Hz) and α-orientation in **4b** (J=6.0 Hz).

Desacetyl compounds **5a** and **5b** were treated in the same manner as **4**. Acid hydrolysis of either **5a** or **5b** gave dialdehyde **2**, the structure assignment of which was supported by IR, ^{1}H-NMR, and HR-MS (table). Desacetylscalaradial **2** showed potent cytotoxic activity in vitro (L-1210 cells, ED_{50} 0.58 µg/ml). Although we know of no report describing the biological activities of these sesterterpenes, it is interesting that natural hydroxy dialdehydes (e.g., warburganal) show various activities[5].

Reduction of **1** with sodium borohydride gave the diol **6**[2,6]: m.p. 175–177 °C; $[\alpha]_D$ +84.1° (MeOH); IR ($CHCl_3$) cm^{-1}, 3600, 3440, 1720, 1671; ^{1}H-NMR δ ($CDCl_3$) ppm, 4.37 and 3.93 (ABq, J=9.0 Hz, 20-H), 3.77 and 3.66 (d-d, J=10.0, 3.0 Hz and J=10.0, 7.5 Hz, 19-H). $NaBH_4$ reduction of **2** afforded the triol **7**: m.p. 218–219 °C; $[\alpha]_D$ +41.3° (MeOH); IR ($CHCl_3$) cm^{-1}, 3330, 1675. Acetylation of both **6** and **7** gave the triacetate **8**.



From another sample of the sponge *C. scalaris* (collected at Kagoshima), we isolated a sesterterpene as the sole product: m.p. 183–184 °C; $[\alpha]_D$ −104.0° (MeOH). The ^{1}H-NMR spectrum of the sesterterpene was identical to that of heteronemin **3**[7], a metabolite from the sponge *Heteronema erecta*[4,8]. Although the stereochemistry of 18-H was given as β in literature[4], the large ^{4}J value (2.0 Hz obtained by spin decoupling experiment) between 18-H and 20-H suggested that the orientation of 18-H was α according to the Dreiding model. Furthermore, the configuration of 19-AcO was probably α, partly because of the very ready elimination of AcOH from **3**[4], and partly because of a small ^{3}J value between 18-H and 19-H of **3** (1.8 Hz) (according to the Dreiding model).

In spite of carefully repeated chromatography (HPLC and HPTLC), scalarin, which was the only compound found in *C. scalaris* by Fattorusso et al.[9], was not found at all in the present experiments.

In the plant kingdom, different compounds are found in morphologically similar samples of the same species depending upon the place of collection. Our finding of the same phenomenon in the marine animal kingdom is interesting.

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2 G. Cimino, S. de Stefano and L. Minale, Experientia *30*, 846 (1974).
3 G. Cimino, S. de Stefano and A. di Luccia, Experientia *35*, 1277 (1979).
4 R. Kazlauskas, P.T. Murphy, R.J. Quinn and R.J. Wells, Tetrahedron Lett. *1976*, 2631.
5 S.P. Tanis and K. Nakanishi, J. Am. chem. Soc. *101*, 4398 (1979).
6 G. Cimino, S. de Stefano and L. Minale, Experientia *29*, 934 (1973).
7 We thank Dr. Wells for identification of heteronemin.
8 Y. Kashman and A. Rudi, Tetrahedron *33*, 2997 (1977).
9 E. Fattorusso, S. Magno, C. Santacroce and D. Sica, Tetrahedron *28*, 5993 (1972).