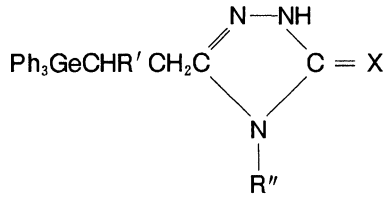
ANTITUMOR ACTIVITY OF 1-TRIPHENYLGERMYL-4-PROPIONO-SUBSTITUTED SEMICARBAZIDES, THIOSEMICARBAZIDES AND THEIR HETEROCYCLIC DERIVATIVES

Fengfu Li[1], Zhongbiao Zhang[1] and Huan Gao*[2]

[1] Institute of Elemento-Organic Chemistry [2] Institute of Polymer Chemistry
Nankai University, Tianjin, 300071 , P. R. China

ABSTRACT

Five organogermanium compounds with the formulae $Ph_3GeCHR'CH_2CONHNHC(X)NHR''$ and



($R' = H, Ph; R'' = Ph, p\text{-}CH_3\text{-}Ph; X = S, O$) were found to possess inhibitory effects on gastric carcinoma MGC-803 *in vitro*.

Key words: germanium, organogermanium, antitumor activity

It has been reported that trialkylgermylpropanoic acids and their derivatives showed antibacterial activity[1] and the selectively inhibitory action on the decomposition of enzymes[2]. However, no antitumor properties of these compounds have been known in the literature. In our previous work[3], we have reported the syntheses of some 1-triphenylgermyl-4-propiono-substituted semicarbazides, thiosemicarbazides (**1**) and their heterocyclic derivatives (**2**). In the present paper, we report the antitumor activity of these compounds.

Table 1 Effects of 1 and 2 on gastric carcinoma MGC-803

Compounds	Inhibition rate(%)[a]		
	1ppm[b]	10ppm	100ppm
1a	38.4	32.8	18.4
1b	20.0	28.8	60.8
1c	8.0	21.6	28.0
2a	28.0	40.0	48.0
2b	0.00	4.80	15.2

[a] Inhibition rate reported in this paper was tested according to reference 4.
[b] Dimethyl sulfoxide was used as solvent, the same in Tables 2 and 3.

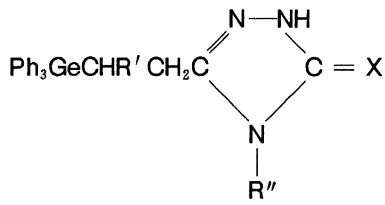
Table 2 Effects of 1 and 2 on gastric carcinoma BGC-823

Compounds	Inhibition rate(%)		
	1ppm	10ppm	100ppm
1a	-6.82	-12.5	-1.55
1b	-4.55	-2.27	68.18
1c	-14.77	-9.09	19.32
2a	-9.09	-4.45	9.09
2b	-34.15	-15.85	-6.10

Table 3 Effects of 1 and 2 on nasopharyneal darcinoma KB

Compounds	Inhibition rate(%)		
	1ppm	10ppm	100ppm
1a	-11.63	-8.53	-3.10
1b	-7.75	20.93	56.59
1c	-1.55	4.65	25.58
2a	-13.18	7.75	18.60
2b	-6.20	-9.30	-3.80

$Ph_3GeCHR'CH_2C(O)NHNHC(X)NHR''$



1

1a R′ =H, X=S, R″ =p-CH_3-Ph
1b R′ =Ph, X=S, R″ =p-CH_3-Ph
1c R′ =Ph, X=O, R″ =Ph

2

2a R′ =H, X=S, R″ =p-CH_3-Ph
2b R′ =Ph, X=O, R″ =Ph

As shown in Table 1, to some extent, compounds 1 and 2 are all effective against gastric carcinoma MGC-803 under the experimental conditions. However, no inhibitory effects were found against gastric carcinoma BGC-823 or nasopharyneal darcinoma KB under the same conditions as above (see Tables 2 and 3).

Acknowledgement. The authors are grateful to the State Key Laboratory of Elemento-Organic Chemistry for financial support of this project, also to Beijing Medical University for their testing of antitumor activity.

REFERENCES

1. Kakimoto, N; Yashihara, T; Akiba, M. and Takada, T., *Japanese Patent*, 6200093; *CA*, **106**, 196613b.
2. Kakimoto, N; Katayama, T; Mori, M. and Hasato, T., *ibid*, 6200092; *CA*, **106**, 196614c.
3. Chen, R. and Li, F., *Appl. Organomet. Chem.*, 1995, **9**, 277.
4. Denizot, F. and Lang, R., *Journal of Immulogical Method*, 1986, **89**, 271.

**Received: May 7, 1996 - Accepted: June 7, 1996 -
Received in revised camera-ready format: October 3, 1996**