

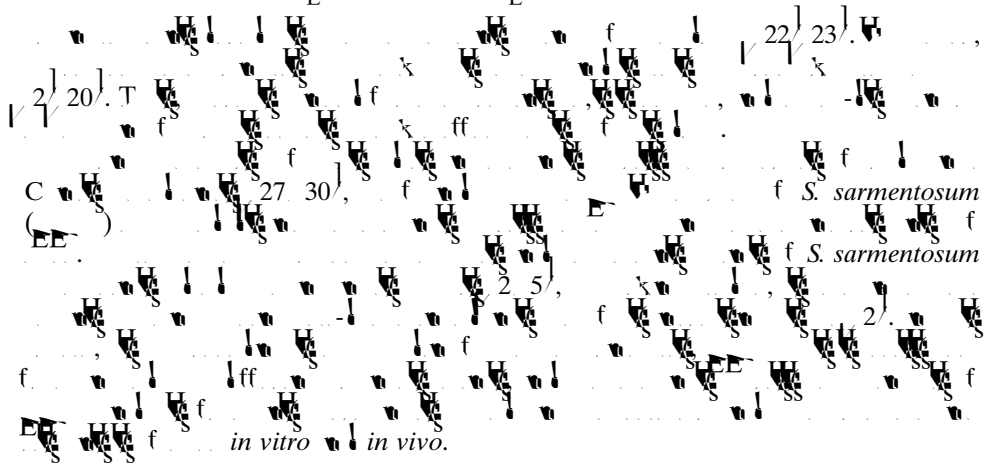
Immunosuppressive Activity of the Ethanol Extract of *Sedum sarmentosum* and Its Fractions on Specific Antibody and Cellular Responses to Ovalbumin in Mice

Feng Qin)) Hong-Xiang Sun*)

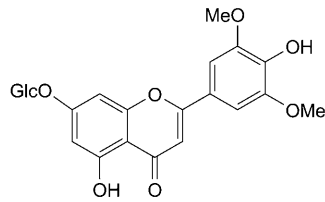
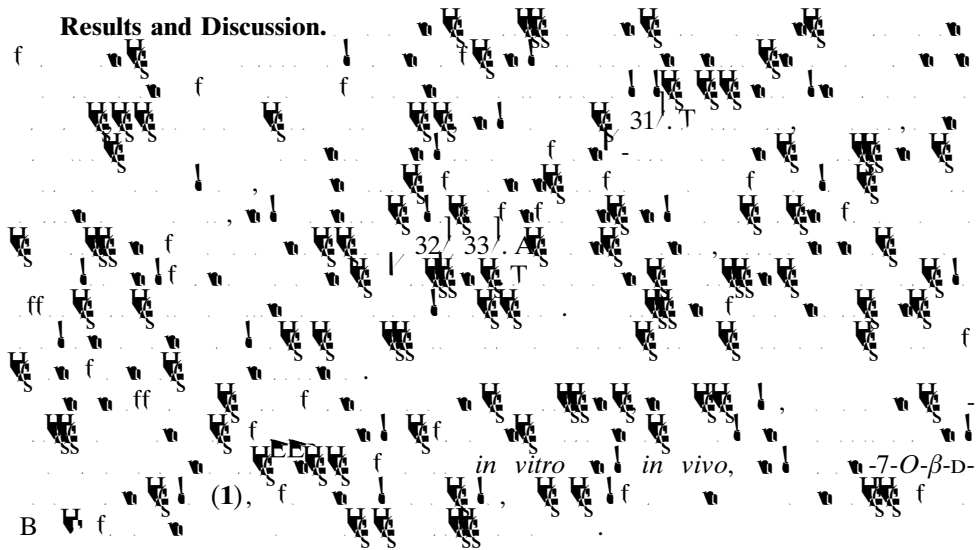
) C ... f A ... 310029, ... C ...
(: 86-571-869-71091; f : 86-571-869-71091; - : @z . .)
) . A & ... C ... T z 225300, ... C ...

T f Sedum sarmentosum () A)
f C z 0 14. B f
f 0.25, 0.5, 1.0 A f 0.1 f 7 28,
f A (C A), (), A f
f 2 B f
f T A f f

Introduction. *Sedum sarmentosum* BUNGE (C)
C f
1), 2), 5), 6), 9), 10),
11), 12), 13),
14), 17), 16), 18),
2), 16), 19), x 10), 20), 21), 23),
3), 24), 25).
S. sarmentosum f
S. sarmentosum f
T f T
f T
f *S. sarmentosum* 26).
f *S. sarmentosum* 7), 2

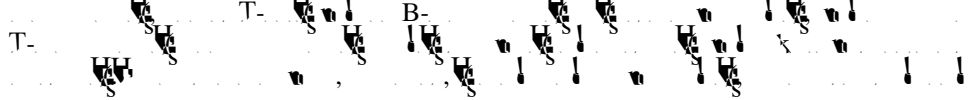


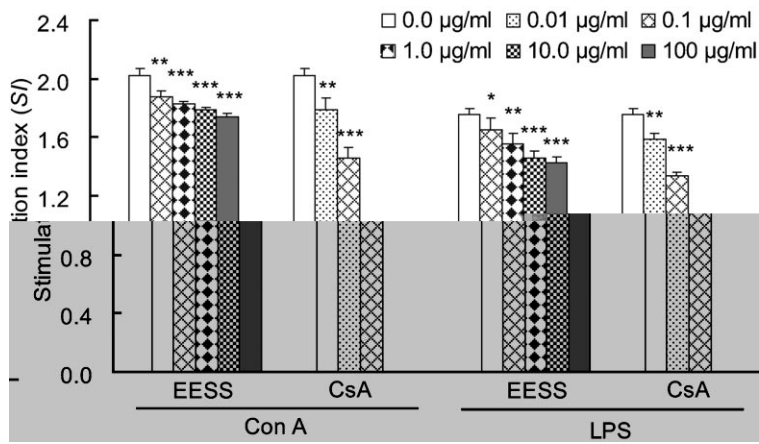
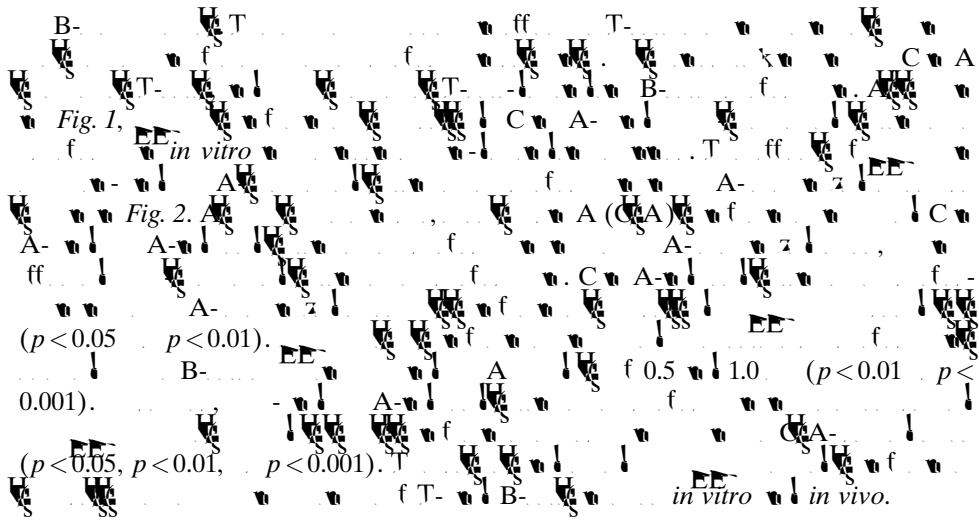
Results and Discussion.



Tricin-7-O-β-D-glucopyranoside (1)
(Glc = β-D-glucopyranosyl)

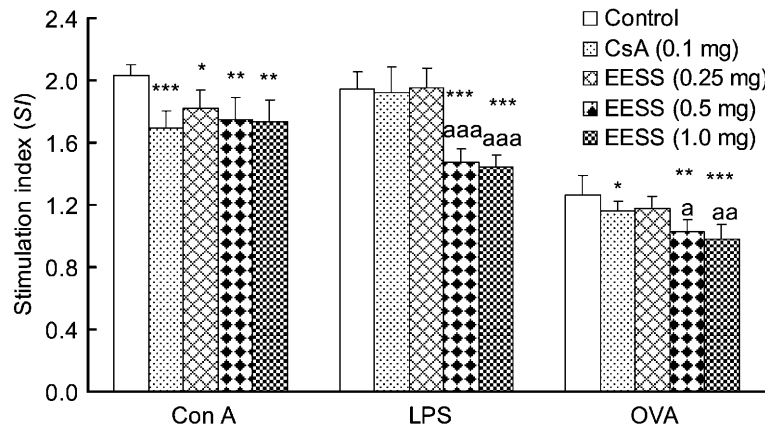
1. Effect of EESS on Splenocyte Proliferation and Cytokine Production



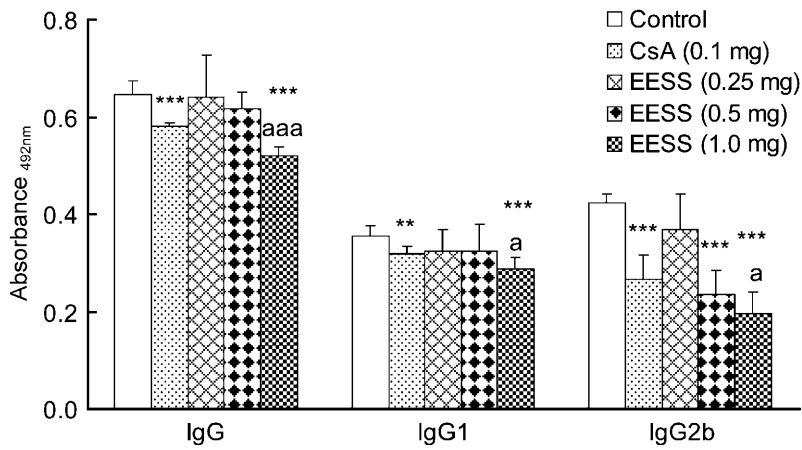


1. Effect of the EtOH extract of *...* () on mitogen-stimulated splenocyte proliferation (SI; *Exper. Part*). $\bar{x} \pm s.d.$ (n = 4). * : p < 0.05, ** : p < 0.01, *** : p < 0.001. CsA: *...* ().

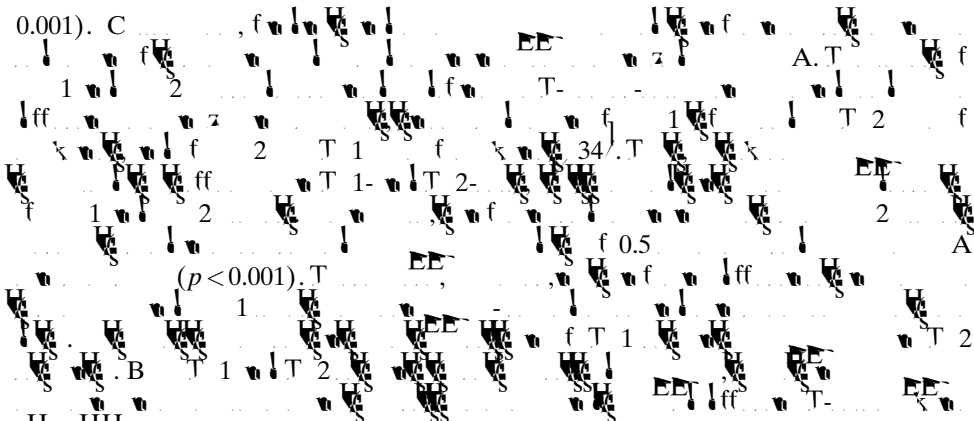
2. Effect of EESS on the OVA-Specific Serum Antibody Response in OVA-Immunized Mice. Fig. 3. *In vivo* effect of EESS and CsA on OVA-specific serum antibody response. The graph shows the antibody titer for OVA. EESS and CsA treatments significantly reduce the antibody titer compared to the control (0.0 µg/ml). Statistical significance is indicated by asterisks: * (p < 0.05), ** (p < 0.01), *** (p < 0.001).



2. Dose-dependent inhibitory effect of the EtOH extract of *... (EE)* on OVA- or mitogen-stimulated splenocyte proliferation in OVA-immunized mice. C... A... 0... 14... f 0.25, 0.5, 1.0... A (CsA, ...) f 0.1... f 7... f 5... f 1... (SI, Exper. Part). T... ±... (n 5). f... A... : p < 0.05, : p < 0.01, : p < 0.001; CsA... : p < 0.05, : p < 0.01, : p < 0.001.



3. Dose-dependent inhibitory effect of the EtOH extract of *... (EE)* on OVA-specific IgG, IgG1, and IgG2b antibodies in OVA-immunized mice. C... A... 0... 14... f 0.25, 0.5, 1.0... A (CsA, ...) f 0.1... f 7... f 5... f 1... (Exper. Part). T... ±... (n 5). f... A... : p < 0.05, : p < 0.01, : p < 0.001; CsA... : p < 0.05, : p < 0.01.



3. Immunosuppressive Activity of Four Fractions of EESS.

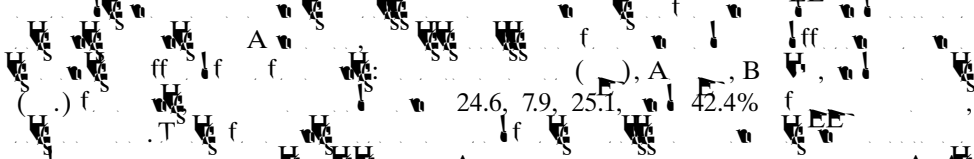


Fig. 4.

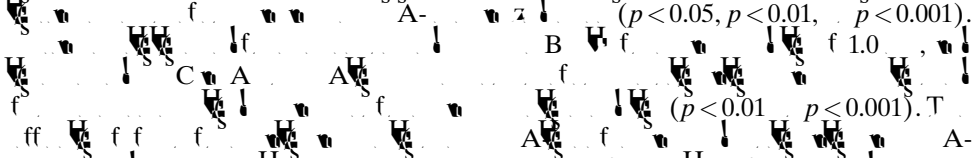
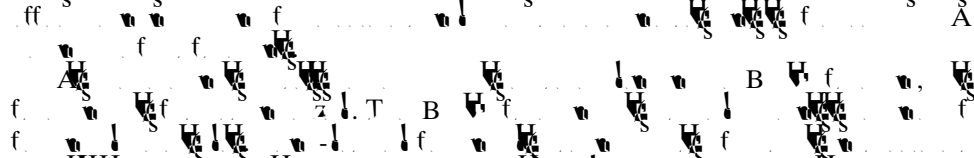
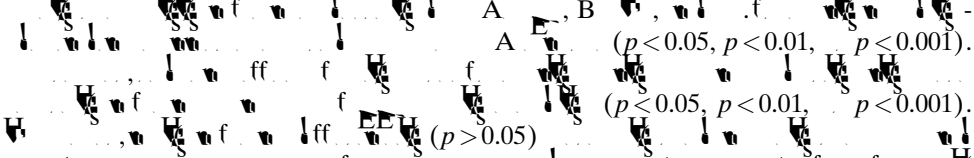


Fig. 5.



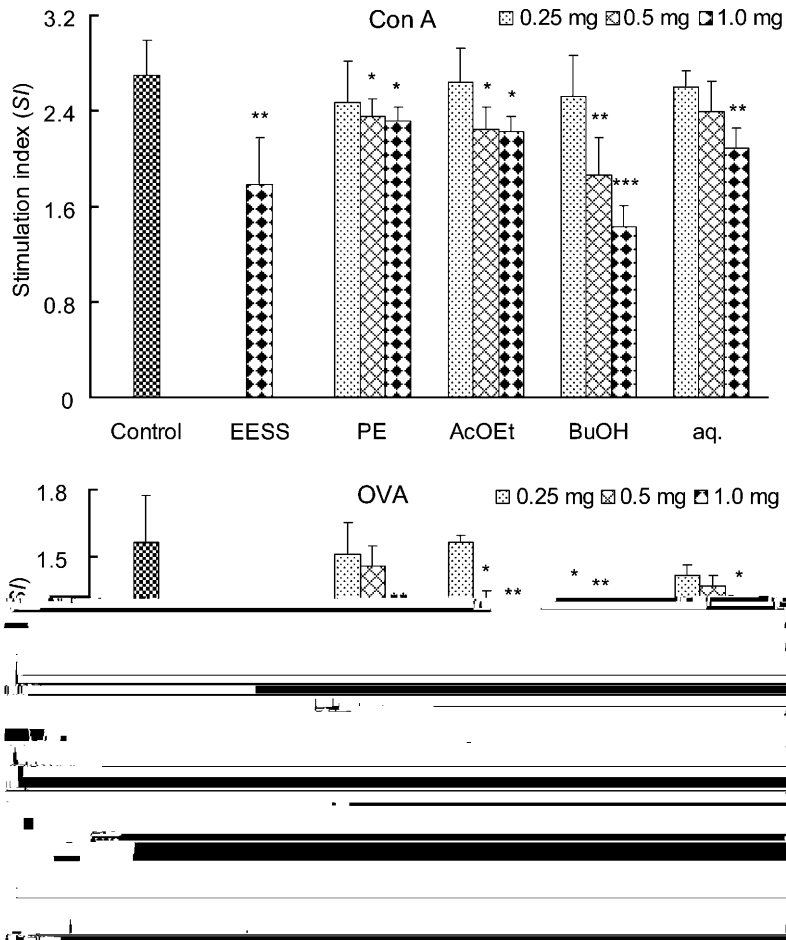
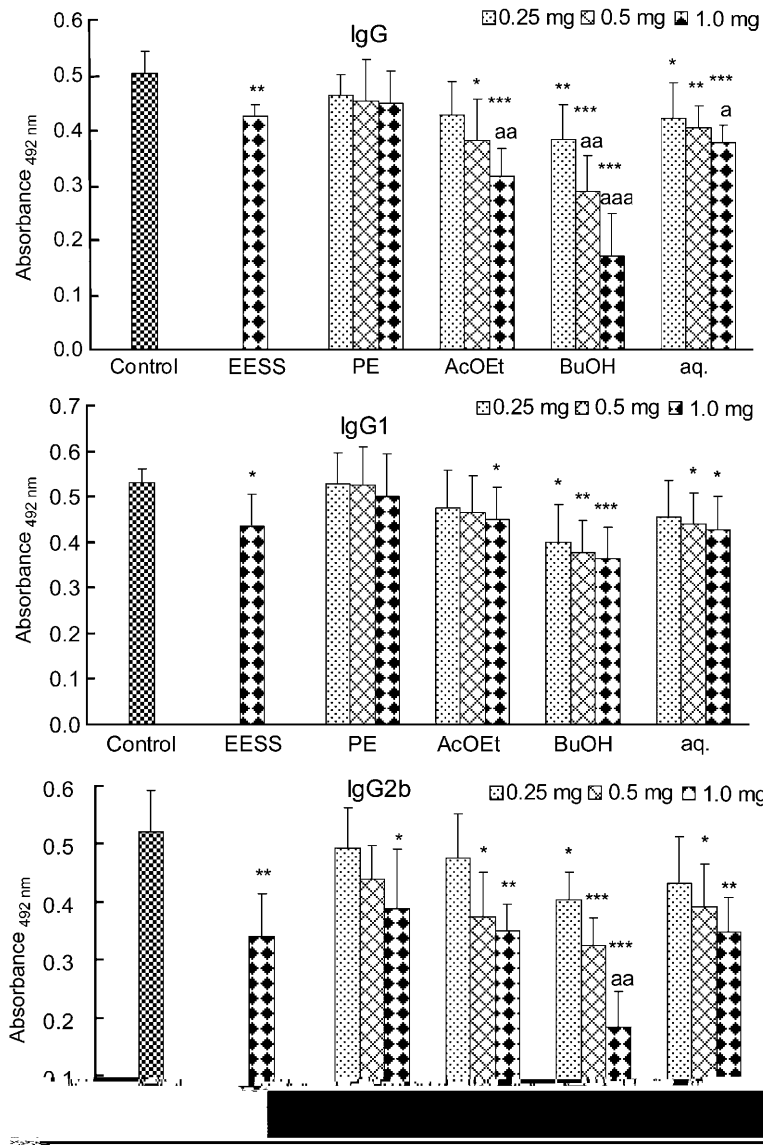


Fig. 4. Effect of the EtOH extract of *H. sphenoloba* (1), and its fractions on Con A- and OVA-stimulated splenocyte proliferation in OVA-immunized mice. C

Con A: A: 0, B: 14, C: 14, D: 14, E: 14, F: 14, G: 14, H: 14, I: 14, J: 14, K: 14, L: 14, M: 14, N: 14, O: 14, P: 14, Q: 14, R: 14, S: 14, T: 14, U: 14, V: 14, W: 14, X: 14, Y: 14, Z: 14, AA: 14, AB: 14, AC: 14, AD: 14, AE: 14, AF: 14, AG: 14, AH: 14, AI: 14, AJ: 14, AK: 14, AL: 14, AM: 14, AN: 14, AO: 14, AP: 14, AQ: 14, AR: 14, AS: 14, AT: 14, AU: 14, AV: 14, AW: 14, AX: 14, AY: 14, AZ: 14, BA: 14, BB: 14, BC: 14, BD: 14, BE: 14, BF: 14, BG: 14, BH: 14, BI: 14, BJ: 14, BK: 14, BL: 14, BM: 14, BN: 14, BO: 14, BP: 14, BQ: 14, BR: 14, BS: 14, BT: 14, BU: 14, BV: 14, BW: 14, BX: 14, BY: 14, BZ: 14, CA: 14, CB: 14, CC: 14, CD: 14, CE: 14, CF: 14, CG: 14, CH: 14, CI: 14, CJ: 14, CK: 14, CL: 14, CM: 14, CN: 14, CO: 14, CP: 14, CQ: 14, CR: 14, CS: 14, CT: 14, CU: 14, CV: 14, CW: 14, CX: 14, CY: 14, CZ: 14, DA: 14, DB: 14, DC: 14, DD: 14, DE: 14, DF: 14, DG: 14, DH: 14, DI: 14, DJ: 14, DK: 14, DL: 14, DM: 14, DN: 14, DO: 14, DP: 14, DQ: 14, DR: 14, DS: 14, DT: 14, DU: 14, DV: 14, DW: 14, DX: 14, DY: 14, DZ: 14, EA: 14, EB: 14, EC: 14, ED: 14, EE: 14, EF: 14, EG: 14, EH: 14, EI: 14, EJ: 14, EK: 14, EL: 14, EM: 14, EN: 14, EO: 14, EP: 14, EQ: 14, ER: 14, ES: 14, ET: 14, EU: 14, EV: 14, EW: 14, EX: 14, EY: 14, EZ: 14, FA: 14, FB: 14, FC: 14, FD: 14, FE: 14, FF: 14, FG: 14, FH: 14, FI: 14, FJ: 14, FK: 14, FL: 14, FM: 14, FN: 14, FO: 14, FP: 14, FQ: 14, FR: 14, FS: 14, FT: 14, FU: 14, FV: 14, FW: 14, FX: 14, FY: 14, FZ: 14, GA: 14, GB: 14, GC: 14, GD: 14, GE: 14, GF: 14, GG: 14, GH: 14, GI: 14, GJ: 14, GK: 14, GL: 14, GM: 14, GN: 14, GO: 14, GP: 14, GQ: 14, GR: 14, GS: 14, GT: 14, GU: 14, GV: 14, GW: 14, GX: 14, GY: 14, GZ: 14, HA: 14, HB: 14, HC: 14, HD: 14, HE: 14, HF: 14, HG: 14, HH: 14, HI: 14, HJ: 14, HK: 14, HL: 14, HM: 14, HN: 14, HO: 14, HP: 14, HQ: 14, HR: 14, HS: 14, HT: 14, HU: 14, HV: 14, HW: 14, HX: 14, HY: 14, HZ: 14, IA: 14, IB: 14, IC: 14, ID: 14, IE: 14, IF: 14, IG: 14, IH: 14, II: 14, IJ: 14, IK: 14, IL: 14, IM: 14, IN: 14, IO: 14, IP: 14, IQ: 14, IR: 14, IS: 14, IT: 14, IU: 14, IV: 14, IW: 14, IX: 14, IY: 14, IZ: 14, JA: 14, JB: 14, JC: 14, JD: 14, JE: 14, JF: 14, JG: 14, JH: 14, JI: 14, JJ: 14, JK: 14, JL: 14, JM: 14, JN: 14, JO: 14, JP: 14, JQ: 14, JR: 14, JS: 14, JT: 14, JU: 14, JV: 14, JW: 14, JX: 14, JY: 14, JZ: 14, KA: 14, KB: 14, KC: 14, KD: 14, KE: 14, KF: 14, KG: 14, KH: 14, KI: 14, KJ: 14, KK: 14, KL: 14, KM: 14, KN: 14, KO: 14, KP: 14, KQ: 14, KR: 14, KS: 14, KT: 14, KU: 14, KV: 14, KW: 14, KX: 14, KY: 14, KZ: 14, LA: 14, LB: 14, LC: 14, LD: 14, LE: 14, LF: 14, LG: 14, LH: 14, LI: 14, LJ: 14, LK: 14, LL: 14, LM: 14, LN: 14, LO: 14, LP: 14, LQ: 14, LR: 14, LS: 14, LT: 14, LU: 14, LV: 14, LW: 14, LX: 14, LY: 14, LZ: 14, MA: 14, MB: 14, MC: 14, MD: 14, ME: 14, MF: 14, MG: 14, MH: 14, MI: 14, MJ: 14, MK: 14, ML: 14, MM: 14, MN: 14, MO: 14, MP: 14, MQ: 14, MR: 14, MS: 14, MT: 14, MU: 14, MV: 14, MW: 14, MX: 14, MY: 14, MZ: 14, NA: 14, NB: 14, NC: 14, ND: 14, NE: 14, NF: 14, NG: 14, NH: 14, NI: 14, NJ: 14, NK: 14, NL: 14, NM: 14, NN: 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14, SJ: 14, SK: 14, SL: 14, SM: 14, SN: 14, SO: 14, SP: 14, SQ: 14, SR: 14, SS: 14, ST: 14, SU: 14, SV: 14, SW: 14, SX: 14, SY: 14, SZ: 14, TA: 14, TB: 14, TC: 14, TD: 14, TE: 14, TF: 14, TG: 14, TH: 14, TI: 14, TJ: 14, TK: 14, TL: 14, TM: 14, TN: 14, TO: 14, TP: 14, TQ: 14, TR: 14, TS: 14, TT: 14, TU: 14, TV: 14, TW: 14, TX: 14, TY: 14, TZ: 14, UA: 14, UB: 14, UC: 14, UD: 14, UE: 14, UF: 14, UG: 14, UH: 14, UI: 14, UJ: 14, UK: 14, UL: 14, UM: 14, UN: 14, UO: 14, UP: 14, UQ: 14, UR: 14, US: 14, UT: 14, UY: 14, UZ: 14, VA: 14, VB: 14, VC: 14, VD: 14, VE: 14, VF: 14, VG: 14, VH: 14, VI: 14, VJ: 14, VK: 14, VL: 14, VM: 14, VN: 14, VO: 14, VP: 14, VQ: 14, VR: 14, VS: 14, VT: 14, VU: 14, VV: 14, VW: 14, VX: 14, VY: 14, VZ: 14, WA: 14, WB: 14, WC: 14, WD: 14, WE: 14, WF: 14, WG: 14, WH: 14, WI: 14, WJ: 14, WK: 14, WL: 14, WM: 14, WN: 14, WO: 14, WP: 14, WQ: 14, WR: 14, WS: 14, WT: 14, WU: 14, WV: 14, WW: 14, WX: 14, WY: 14, WZ: 14, XA: 14, XB: 14, XC: 14, XD: 14, XE: 14, XF: 14, XG: 14, XH: 14, XI: 14, XJ: 14, XK: 14, XL: 14, XM: 14, XN: 14, XO: 14, XP: 14, XQ: 14, XR: 14, XS: 14, XT: 14, XU: 14, XV: 14, XW: 14, XX: 14, XY: 14, XZ: 14, YA: 14, YB: 14, YC: 14, YD: 14, YE: 14, YF: 14, YG: 14, YH: 14, YI: 14, YJ: 14, YK: 14, YL: 14, YM: 14, YN: 14, YO: 14, YP: 14, YQ: 14, YR: 14, YS: 14, YT: 14, YU: 14, YV: 14, YW: 14, YX: 14, YY: 14, YZ: 14, ZA: 14, ZB: 14, ZC: 14, ZD: 14, ZE: 14, ZF: 14, ZG: 14, ZH: 14, ZI: 14, ZJ: 14, ZK: 14, ZL: 14, ZM: 14, ZN: 14, ZO: 14, ZP: 14, ZQ: 14, ZR: 14, ZS: 14, ZT: 14, ZU: 14, ZV: 14, ZW: 14, ZX: 14, ZY: 14, ZZ: 14

37/38
 β -D-7-O- β -D- (1), β -D-7-O- β -D-
 β -D-3-O- β -D-
 β -D-3,7-O- α -L-
 β -D-3-O- α -6'''-ff
 β -D-3'-O- β -D-
 B
 Sephadex LH-20



5. Effect of the EtOH extract of *...* (EE), and its fractions on OVA-specific IgG, IgG1, and IgG2b antibodies in OVA-immunized mice. (A) 0, 14, 28, 42, 56, 70, 84, 98, 112, 126, 140, 154, 168, 182, 196, 210, 224, 238, 252, 266, 280, 294, 308, 322, 336, 350, 364, 378, 392, 406, 420, 434, 448, 462, 476, 490, 504, 518, 532, 546, 560, 574, 588, 602, 616, 630, 644, 658, 672, 686, 700, 714, 728, 742, 756, 770, 784, 798, 812, 826, 840, 854, 868, 882, 896, 910, 924, 938, 952, 966, 980, 994, 1008, 1022, 1036, 1050, 1064, 1078, 1092, 1106, 1120, 1134, 1148, 1162, 1176, 1190, 1204, 1218, 1232, 1246, 1260, 1274, 1288, 1302, 1316, 1330, 1344, 1358, 1372, 1386, 1400, 1414, 1428, 1442, 1456, 1470, 1484, 1498, 1512, 1526, 1540, 1554, 1568, 1582, 1596, 1610, 1624, 1638, 1652, 1666, 1680, 1694, 1708, 1722, 1736, 1750, 1764, 1778, 1792, 1806, 1820, 1834, 1848, 1862, 1876, 1890, 1904, 1918, 1932, 1946, 1960, 1974, 1988, 2002, 2016, 2030, 2044, 2058, 2072, 2086, 2100, 2114, 2128, 2142, 2156, 2170, 2184, 2198, 2212, 2226, 2240, 2254, 2268, 2282, 2296, 2310, 2324, 2338, 2352, 2366, 2380, 2394, 2408, 2422, 2436, 2450, 2464, 2478, 2492, 2506, 2520, 2534, 2548, 2562, 2576, 2590, 2604, 2618, 2632, 2646, 2660, 2674, 2688, 2702, 2716, 2730, 2744, 2758, 2772, 2786, 2800, 2814, 2828, 2842, 2856, 2870, 2884, 2898, 2912, 2926, 2940, 2954, 2968, 2982, 2996, 3010, 3024, 3038, 3052, 3066, 3080, 3094, 3108, 3122, 3136, 3150, 3164, 3178, 3192, 3206, 3220, 3234, 3248, 3262, 3276, 3290, 3304, 3318, 3332, 3346, 3360, 3374, 3388, 3402, 3416, 3430, 3444, 3458, 3472, 3486, 3500, 3514, 3528, 3542, 3556, 3570, 3584, 3598, 3612, 3626, 3640, 3654, 3668, 3682, 3696, 3710, 3724, 3738, 3752, 3766, 3780, 3794, 3808, 3822, 3836, 3850, 3864, 3878, 3892, 3906, 3920, 3934, 3948, 3962, 3976, 3990, 4004, 4018, 4032, 4046, 4060, 4074, 4088, 4102, 4116, 4130, 4144, 4158, 4172, 4186, 4200, 4214, 4228, 4242, 4256, 4270, 4284, 4298, 4312, 4326, 4340, 4354, 4368, 4382, 4396, 4410, 4424, 4438, 4452, 4466, 4480, 4494, 4508, 4522, 4536, 4550, 4564, 4578, 4592, 4606, 4620, 4634, 4648, 4662, 4676, 4690, 4704, 4718, 4732, 4746, 4760, 4774, 4788, 4802, 4816, 4830, 4844, 4858, 4872, 4886, 4900, 4914, 4928, 4942, 4956, 4970, 4984, 4998, 5012, 5026, 5040, 5054, 5068, 5082, 5096, 5110, 5124, 5138, 5152, 5166, 5180, 5194, 5208, 5222, 5236, 5250, 5264, 5278, 5292, 5306, 5320, 5334, 5348, 5362, 5376, 5390, 5404, 5418, 5432, 5446, 5460, 5474, 5488, 5502, 5516, 5530, 5544, 5558, 5572, 5586, 5600, 5614, 5628, 5642, 5656, 5670, 5684, 5698, 5712, 5726, 5740, 5754, 5768, 5782, 5796, 5810, 5824, 5838, 5852, 5866, 5880, 5894, 5908, 5922, 5936, 5950, 5964, 5978, 5992, 6006, 6020, 6034, 6048, 6062, 6076, 6090, 6104, 6118, 6132, 6146, 6160, 6174, 6188, 6202, 6216, 6230, 6244, 6258, 6272, 6286, 6300, 6314, 6328, 6342, 6356, 6370, 6384, 6398, 6412, 6426, 6440, 6454, 6468, 6482, 6496, 6510, 6524, 6538, 6552, 6566, 6580, 6594, 6608, 6622, 6636, 6650, 6664, 6678, 6692, 6706, 6720, 6734, 6748, 6762, 6776, 6790, 6804, 6818, 6832, 6846, 6860, 6874, 6888, 6902, 6916, 6930, 6944, 6958, 6972, 6986, 7000, 7014, 7028, 7042, 7056, 7070, 7084, 7098, 7112, 7126, 7140, 7154, 7168, 7182, 7196, 7210, 7224, 7238, 7252, 7266, 7280, 7294, 7308, 7322, 7336, 7350, 7364, 7378, 7392, 7406, 7420, 7434, 7448, 7462, 7476, 7490, 7504, 7518, 7532, 7546, 7560, 7574, 7588, 7602, 7616, 7630, 7644, 7658, 7672, 7686, 7700, 7714, 7728, 7742, 7756, 7770, 7784, 7798, 7812, 7826, 7840, 7854, 7868, 7882, 7896, 7910, 7924, 7938, 7952, 7966, 7980, 7994, 8008, 8022, 8036, 8050, 8064, 8078, 8092, 8106, 8120, 8134, 8148, 8162, 8176, 8190, 8204, 8218, 8232, 8246, 8260, 8274, 8288, 8302, 8316, 8330, 8344, 8358, 8372, 8386, 8400, 8414, 8428, 8442, 8456, 8470, 8484, 8498, 8512, 8526, 8540, 8554, 8568, 8582, 8596, 8610, 8624, 8638, 8652, 8666, 8680, 8694, 8708, 8722, 8736, 8750, 8764, 8778, 8792, 8806, 8820, 8834, 8848, 8862, 8876, 8890, 8904, 8918, 8932, 8946, 8960, 8974, 8988, 9002, 9016, 9030, 9044, 9058, 9072, 9086, 9100, 9114, 9128, 9142, 9156, 9170, 9184, 9198, 9212, 9226, 9240, 9254, 9268, 9282, 9296, 9310, 9324, 9338, 9352, 9366, 9380, 9394, 9408, 9422, 9436, 9450, 9464, 9478, 9492, 9506, 9520, 9534, 9548, 9562, 9576, 9590, 9604, 9618, 9632, 9646, 9660, 9674, 9688, 9702, 9716, 9730, 9744, 9758, 9772, 9786, 9800, 9814, 9828, 9842, 9856, 9870, 9884, 9898, 9912, 9926, 9940, 9954, 9968, 9982, 9996, 10000.

in vitro 39]. T f, I SSS, T- B-
 3.44±0.05%. B f, T f I B
in vitro *in vivo* f *S. sarmentosum*.

Conclusions.

in vitro, C A-
 A- A- B
 f *S. sarmentosum* f
 C

Experimental Part

General.

(A), 3-(4,5- -2-)-2,5- -2H-
 (TT), A(C A), (), -1640
 Sigma Chemical Co. (A),
 Southern Biotech. Assoc. (B, A,
 A), f (C) Hangzhou Sijiqing Corp.,
 Zhejiang Wanma Pharm Co. Ltd, A(CA,
 Hangzhou Huadong Medicine Co. Ltd,

Experimental Animals.

C (, 5) 18 22
 Zhejiang Experimental Animal Center (C f 22-2001001, C)
 ad libitum,
 24±1°, 50±10%, 12- /12-
 Institute for Experimental Animals

Plant Material.

Sedum sarmentosum BUNGE
 2004. A (. 20040612)
 Laboratory of Nature Drug, C f A
 f. Xiang-Ji Xue C f

Preparation and Analysis of Extract.

S. sarmentosum 40°
 (3x) 70%
 (1700×g, 30),
 45° f ca.
 157.15 (; 5.24% (w/w)).
 A B
 A B f T B f
 0.22-μ Millipore f C.T
 Symmetry® C18 (250 ×
 4.6 μ), 2 35:65 Waters 2996 PDA
 Water 600E C
 A x . f 10 / 0.89% T
 0.22-μ Millipore

Limulus (Zhejiang A and C Biological, C).

Splenocyte Proliferation Assay.

(Sigma), Hank's (1500xg, 4°C, 10 min), 1640 (12 M HEPES (pH 7.1), 0.05 M 2-mercaptoethanol, 10% FCS). Cells were cultured in 96-well plates (Nunc) at 1x10⁷ cells/ml in 100 µl of medium (5 µl/ml insulin, 10 µl/ml transferrin, 0.1-100.0 µl/ml selenium). Cells were incubated at 37°C for 48 hours in 5% CO₂ atmosphere. After 48 hours, 50 µl of ³H-thymidine (1400xg, 5 min) was added to each well (192 µCi/ml, 8 µCi/well). After 15 hours, 200 µl of medium was removed and the cells were harvested (SI-MAC).

Administration and Immunization.

0.2 ml of Alum (0.2 mg/ml) was administered intraperitoneally to mice. Mice were immunized with 0.1-1.0 ml of antigen (0.1-0.2 mg/ml) in 0.2 ml of saline. After 7 days, 0.2 ml of antigen (0.1-0.2 mg/ml) in 0.2 ml of saline was administered intraperitoneally to mice.

Splenocyte Proliferation Assay.

Splenocytes were harvested from mice and cultured in 96-well plates (Nunc) at 1x10⁷ cells/ml.

Statistical Analysis. T Student's t -test, $p < 0.05$.
 Zhejiang Provincial Science and Technology Council (2004 13 1360002)

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