

# Radioprotective activity of chitabis

Gulik E.S., Kostesha N.Ya.

Tomsk State University, Tomsk, Russia

The radioprotective effect of low molecular weight chitosan dissolved in an aqueous extract of *Abies sibirica* fir-needles (abisib) – chitabis was studied. Chitabis (5 ml/kg) was administered per os immediately after X-irradiation of experimental rats and then within 10 days. Control animals received distilled water at the same dose. Administration of chitabis increases survival and life expectancy of experimental rats X-irradiated at a dose of LD90/30 (table 1).

**Table 1 – Radioprotective activity of abisib, chitosan and chitabis by irradiating rats at a dose of 7.5 Gy**

variant	number of repetitions	number of rats	survival, %	life expectancy, day
7.5 Gy + distilled water (control)	5	48	9.8 ± 7.8	15.4 ± 2.3
7.5 Gy + abisib	4	26	18.8 ± 9.4	16.3 ± 3.6
7.5 Gy + chitosan	3	33	25.0 ± 2.9	21.8 ± 4.5
7.5 Gy + chitabis	4	38	34.0 ± 3.5*	28.4 ± 3.1*

Notation: \* – p < 0.05

The radioprotective activity of chitabis was studied by irradiating rats at a dose of 5.5 Gy for two critical systems of the body: hematopoietic and gastrointestinal.

The experiment demonstrated a weakening of the degree of leukopenia and a greater degree of preservation of bone marrow cellularity in irradiated animals taking chitabis compared to irradiated rats (table 2).

**Table 2 – Peripheral blood counts and bone marrow cellularity by irradiating rats at a dose of 5.5 Gy after 10-days administration of abisib, chitosan, chitabis**

time after X-irradiation, day	groups	erythrocytes, x 10 <sup>12</sup> /l	leukocytes, x 10 <sup>9</sup> /l	hemoglobin, g/l	bone marrow cellularity, x 10 <sup>6</sup> /haunch
–	intact control	6.00 ± 0.22	13.19 ± 0.86	142.1 ± 6.6	108.75 ± 5.16
7	X-irradiation	4.49 ± 0.04*	0.95 ± 0.06*	144.0 ± 9.0	72.40 ± 3.47*
	X-irradiation + abisib	3.81 ± 0.11**/**	1.29 ± 0.04**/**	115.6 ± 6.0**/**	66.56 ± 6.09*
	X-irradiation + chitosan	3.07 ± 0.21**/**	1.20 ± 0.03**/**	116.4 ± 6.6**/**	69.56 ± 3.07*
	X-irradiation + chitabis	4.80 ± 0.19**/**	1.58 ± 0.08**/**	152.9 ± 7.8	56.16 ± 3.07**/**
14	X-irradiation	2.96 ± 0.28*	1.36 ± 0.11*	85.5 ± 10.1*	58.70 ± 3.10*
	X-irradiation + abisib	2.64 ± 0.20*	1.99 ± 0.27**/**	70.8 ± 6.1*	60.76 ± 6.33*
	X-irradiation + chitosan	3.70 ± 0.25*	2.31 ± 0.28**/**	114.1 ± 4.7**/**	82.50 ± 2.61**/**
	X-irradiation + chitabis	3.68 ± 0.32*	2.77 ± 0.32**/**	101.4 ± 8.4*	80.72 ± 9.81**/**

Notation: \* – statistically significant differences between indicators and intact control (p < 0.05)

\*\* – statistically significant differences of the indicators from the corresponding irradiated control (p < 0.05)

On the part of the gastrointestinal tract, the normalizing effect of chitabis on the epithelial mucous layer of the small intestine of irradiated animals is noted, which contributes to the formation of a more resistant to destruction of the mucous layer of the small intestine. We think that the radioprotective activity of the complex chitabis is the result of the synergism of its components - chitosan and abisib.