

# Treatment of Mice with a Herbal Preparation (Liv.52) reduces the Frequency of Radiation-Induced Chromosomal Damage in Bone Marrow

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## ABSTRACT

Frequency of chromosomal aberrations was studied for 1/4 to 4 days post irradiation in the bone marrow of control and irradiated mice. Liv.52, a herbal preparation, of 4.5 Gy exposure. The frequency of chromosomal aberrations significantly increased in a dose dependent manner and Liv.52 + irradiated mice. The frequency of aberrations as recorded at day 1/2 post exposure, significantly decreased after day 1 in both groups. The frequency of body yields of aberrations significantly were not in Liv.52 + irradiated mice.

## INTRODUCTION

Liv.52 is a non-toxic herbal preparation composed of *Capparis spinosa*, *Cichorium intybus*, *Solanum nigrum*, *Cassia occidentalis*, *Terminalia arjuna*, *Achillea millefolium* and *Tamarix gallica*. It has been reported to be a natural antioxidant and a detoxifier of carcinogens (Maiti et al., 1988; Srinivasan et al., 1988). The antioxidant property of Liv.52 as demonstrated for its free radical scavenging activity by Santhosh et al. (1984a, b) against oxidative stress, diabetes and senescence. Recently, Jagetia and Ganapathi (1988) have reported a protective action of Liv.52 against radiation induced chromosomal damage in bone marrow.

The present study was undertaken to evaluate the protective action of Liv.52 against radiation induced chromosomal aberrations in bone marrow of mice exposed to 4.5 Gy of whole body  $\gamma$ -irradiation.

## MATERIAL AND METHODS

Male Swiss albino mice, 8 weeks old and weighing  $20 \pm 2.54$  g were selected from an inbred colony and maintained under controlled conditions of temperature ( $23 \pm 2^\circ$ ), humidity ( $50 \pm 5\%$ ) and photoperiod (10 h light and 14 h dark). The animals were fed on standard food (10% Borden, 20% fish meal, 5% yeast, 0.5% sesame oil, 0.5% and silica 0.25%) *ad libitum*. The animals were kept in a room with temperature controlled and added light (10 h light and 14 h dark) as bedding.

The mice of an age 8 weeks were divided into 22 groups (22 animals per group) and a 5% dextrose solution once a day for 7 days before irradiation and served as control. The control mice received 500 mg/kg of Liv.52 (supplied by the manufacturer) in 5% dextrose solution as a pre-irradiation. The mice were irradiated on day 7 with a dose of 4.5 Gy of  $\gamma$  irradiation (source: a cobalt-60 source) in a lead shielded chamber as described. The animals were irradiated in a dose of 0.88 Gy/min, at a distance of 10 cm from the source (dose rate determined by dosimetry). So on,

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The frequency of absences increased for day 1/4 and on day 1/2 in both sexes and L .52 + ad ad o s and dec med t e r e a f e . The frequency of absences as s n f can y e s s n t e L .52 + ad ad o t an n t e ad ad o (A b r e ) .

No ad breath were seen a day 1/4, but continued to increase on day 1/2 and dec med t e r e a f e . The no a r e s t e r e s o r e d on days 4 and 2 n t e ad ad and L .52 + ad ad o r e s e c t e y (A b r e ) .

No osobre breaths, cent c n s, d cen cs and no osobre exo an res were observed a day 1/2 os ex os e n b o t o s . The frequency of no osobre breaths and cent c n s as t e r e s t on day 1/2 a o d cen cs and exo an res as t e r e s t on day 1/2 and dec med t e r e a f e . The abs a t on f r e q u e n c y as a l a y s o r e n t e L .52 + ad ad o t an n t e ad ad o (A b r e ) .

The frequency of o a abs a t o n s as r e c o d e d on day 1/2 n b o t o s , t e r e a f e t dec med con n o s y o day 4 os t ad a on . The r e c e n t a r e o f o a abs a t o n s as s n f can y o r e n t e L .52 + ad ad o t o day 1/2 an n t e ad ad o (A b r e ) .

The zed ce s increased for day 1/4 and t e r e s n b e o f t h e s e c e s as r e c o d e d on day ; t e r e a f e z e d ce s c o d n o t b e o b s e r e d . The frequency of z e d ce s as s n f can y o r e n t e L .52 + ad ad o t an n t e ad ad o (A b r e ) .

**DISCUSSION**

L .52 has been reported to occur as a ans, ad a on nd ced s c m e s s , d e a t s and s r e n n y (Sa n e t a l , 84a,b). The ad n s t a t o n o f L .52 o o ad a on t e s r e d n a s n f can y dec me n t o o s o a abs a t o n s (A b r e ) . The frequency of absences as s n f can y o r e n t e L .52 + ad ad o t an n t e ad ad o a a os ex os t e r e o d s t e d . e t a and t a r e ( 85, 80) and t o as and t a r e ( 87) a r e a s o r e o t a dec me n abs a t o n s n c e t e a r e d M P e and R 2 2 , s n y o n c o b n a t o n , b e o r e x o s t o y ad a on .

L .52 as a y r e c t e n o r e c n t e o o s o r e s a a n s , ad a on nd ced d a a r e , as s r e d e n c e d by t e o r e f r e q u e n c y o f o a c b r e a s , o o s o r e b r e a s , cen c n s , d cen cs , exo an res , acen c f a r e n s and o a abs a t o n s . Mos o f t h e s e abs a t o n s ad r e med o t e n o a r e a day 3 os t e x os t e n t e L .52 + ad ad o t as c o a r e d o t e ad ad o . These nd n s s o t o r e a r e o t o n c o n c r e , t e r e a f e f r e q u e n c y o f c o n c r e n t e L .52 + ad ad o c e r e med o a n o a r e a day 3 os t e x os t e (A r t a and S a n a a t , 8 ) .

The frequency of z e d ce s as a l a y s s n f can y o r e n t e d t e a r e d o t an n t e ad ad o . The s n d c a r e s a L .52 c o d o r e c t e c e s a a n s t e s e r e n c t o n o f ad a on d a a r e .

The exact mechanism by which L.52 resistance to osso ad a are s no n. The de re on of n ace a a one (S) has been re o ed o be one of the ca ses of ad a on nd ced da a re, re nced re s of n ace a S are res ons be fo ad o o ec re ac on. A s a re an s of ac on ay be a b ed o re ad o o ec re ac on of L.52, as been re o ed o res o re n ace a S re re o no a n as ex osed o 4.0 Gy of y ad a on (Sa a et al., 8 ).

The s o n re dence a do b re s, and b re a s (dsb) are any res ons be fo re fo a on of o o so a abe a ons (Ma a an et al., 80; B yan, 88). It s oss be a re re re ad re s of S n re L.52 re ad o ay be abe o re nce re re a of dsb, o re n re re re ncy of o o so a abe a ons n re s o . It s conc s on s s o ed by re re n, s dy of ( 8 ) as re o ed a o o so a abe a ons re re a re d on y n S os re ce s.

**ACKNOWLEDGEMENTS**

re ac no re re an s re nance s o re xended by re re a aya o any, o ca y o s o . re ad a on re ce s o ed by re re ad, re a re n of Rad o re a y and nco o y, M, Man a re re an s y ac no re d re . re a so s o re an M. re a re and a Maya o re re a re n, M, Man a re re s re ana ys s.

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