

LITHIUM AND LIFESPAN IN C. ELEGANS

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Lithium the element was discovered over 188 years ago. Seminal work by John Cade, over 50 years ago and then subsequent clinical studies by Mogens Schou, lead to lithium being recognized as an effective treatment for manic-depressive/bipolar disorder. Lithium has remained the mainstay of treatment for this illness for more than three decades in North America. Advances in cellular and molecular biology have led to the identification of several targets of lithium's actions, however, the exact mechanism of action in bipolar disorder is unknown. A growing body of evidence demonstrates that lithium can exert neuroprotective effects both in vitro and in vivo. These effects may in part be due to action on two molecular targets, the cytoprotective Bcl-2 (the mammalian ortholog of CED-9, cell death abnormal-9) and GSK-3 β ; (glycogen synthase kinase-3 β). These discoveries may have major impact on the use of this interesting cation in medicine and biology. We have begun the examination of the lifespan and stress effects of lithium Chloride in *C. elegans*. We discovered that post-developmental treatment with lithium Chloride has robust effects on lifespan in a dose dependent manner. Wild type population treated with LiCl and cultured at 25oC showed up to a 45% increase in median lifespan and 16% in maximal lifespan. From examination of different genetic backgrounds, we have found this effect to be DAF-16 independent. We are investigating the possibility that lithium is having neuroprotective effects that slow aging in adult nematodes. We also observe that lithium markedly decreases fertility and embryonic viability and are examining the role of the germ line and gonad in the modulation of lifespan by lithium.