

Dynein 2 Light Intermediate Chain Phenotype

Liz Corpuz and David Asai

Background. Dynein is a motor protein in cells that converts ATP into mechanical energy and transports cargo along the microtubules of cells. Dynein 2 Light Intermediate Chain (D2LIC) is a component of Dynein 2. It is believed to have a role in intraflagellar transport (IFT). The goal is to determine D2LIC's phenotype: binding the cargo in IFT to the heavy chain or acting as a key that helps start IFT.

Approach. Using a cell line of *Tetrahymena thermophila* with an over expression construct for D2LIC, we looked at the cells' velocity, cilia length, and cilia per micrometer after exposing the cell line to high concentrations of cadmium over a period of time. Velocity was measured by measuring path lengths in pictures. Cilia length and cilia per micrometer was determined by staining cells with antibodies and then measuring the cilia and the circumference with the aid of a laser scanning microscope. A wild-type cell line served as a control.

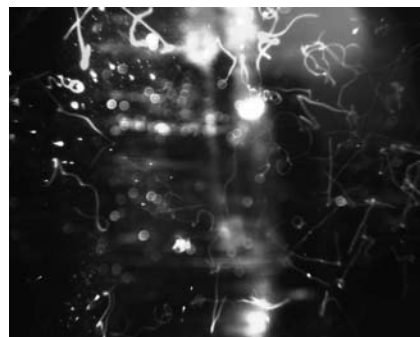


Figure 1. Sample picture of *T. thermophila* with an exposure time of six seconds.

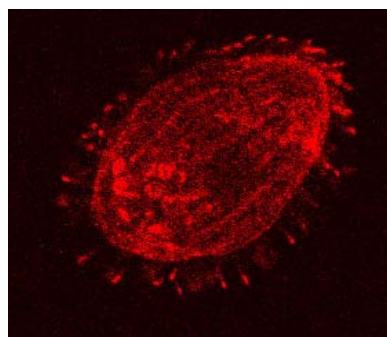


Figure 2. Picture of *T. thermophila* with antibody staining, picture taken with laser scanning microscope

Cadmium Concentration 5 hours ($\mu\text{g/mL}$)	Average Velocity ($\mu\text{m/sec}$)	P-value
10	108.911	0.400912
0	110.402	

Cadmium Concentration 5 hours ($\mu\text{g/mL}$)	Average Cilia Length (μm)	P-value
10	3.43	1.14005E-06
0	4.10	

Cadmium Concentration 5 hours ($\mu\text{g/mL}$)	Average number of cilia per μm	P-value
10	0.1449	1.195E-14
0	0.1999	

Tables displaying the results for the OXD2LIC cell line, using an unpaired one-tail t-test, $p < 0.05$

Results. The cells exposed to cadmium had a cell velocity that was not significantly different to those not exposed. The control cell line also had the same results. Both cell lines also demonstrated a significant difference between the cells exposed to cadmium and those not without the cadmium treatment. A similar result was obtained when examining number of cilia per micrometer.

Future Work. A closer look of the OXD2LIC line in low concentrations of cadmium over a twenty-four hour period may reveal a phenotypic change after several generations.

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