

A study of genes controlling carcinogenesis
in a regenerative model
flatworm *Macrostomum lignano*

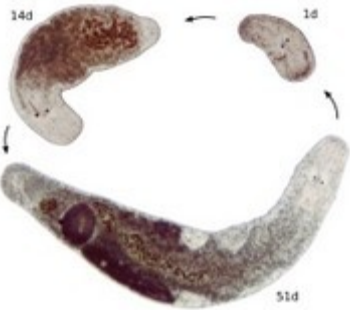
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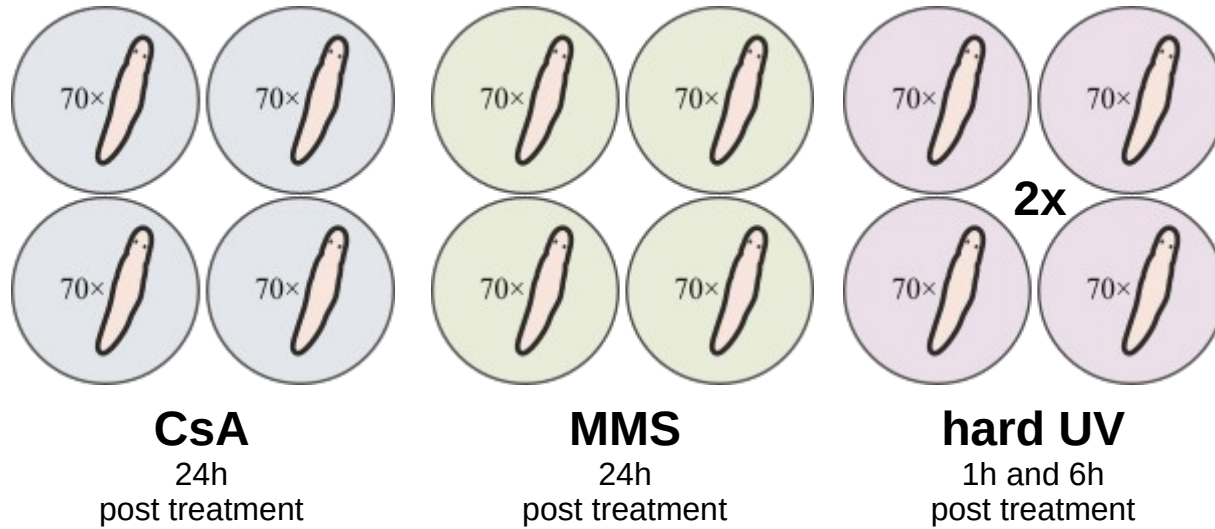
100 μm



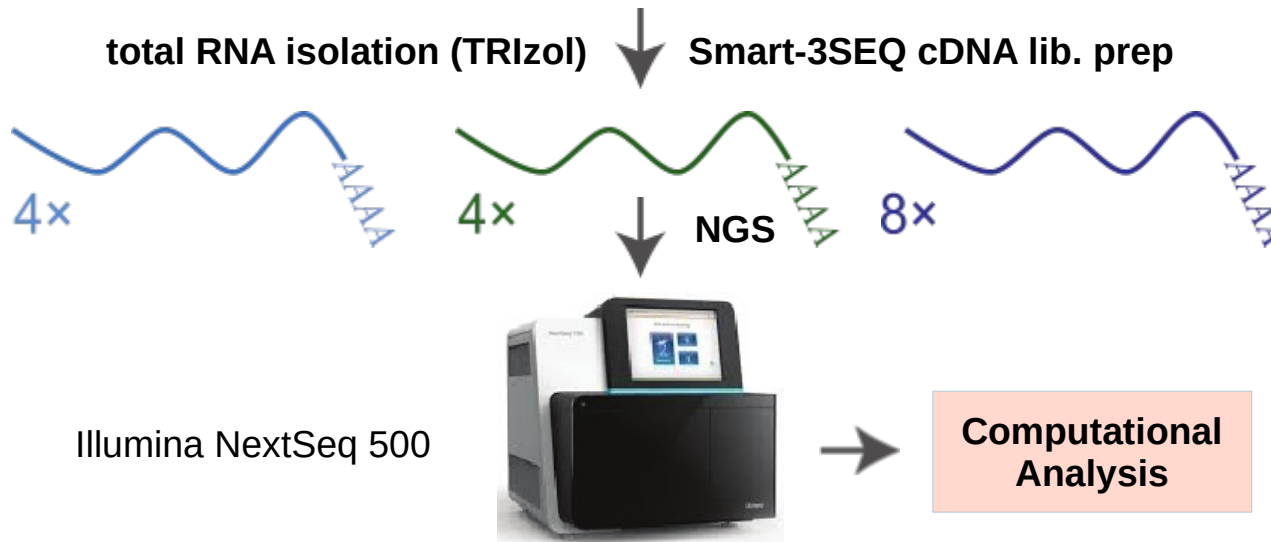
`The restriction of regeneration is thought to evolve as a measure against cancer, which is not found in highly regenerative flatworms, suggesting they evolved other mechanisms to keep their cells under control.

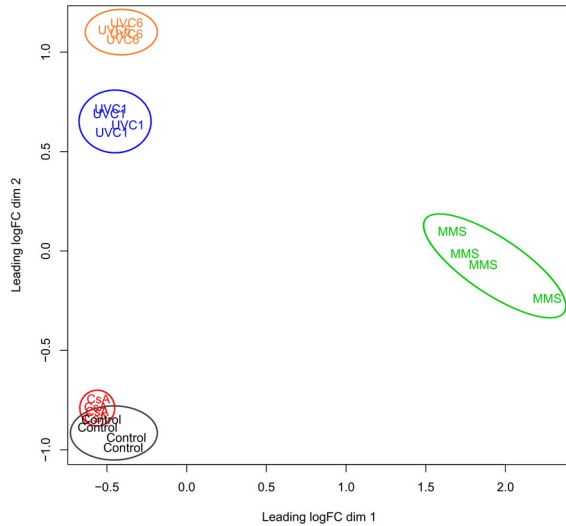
`*Macrostomum lignano* is a free-living novel flatworm model that provides a genetically tractable experimental system to study the interplay between regeneration and cancer.



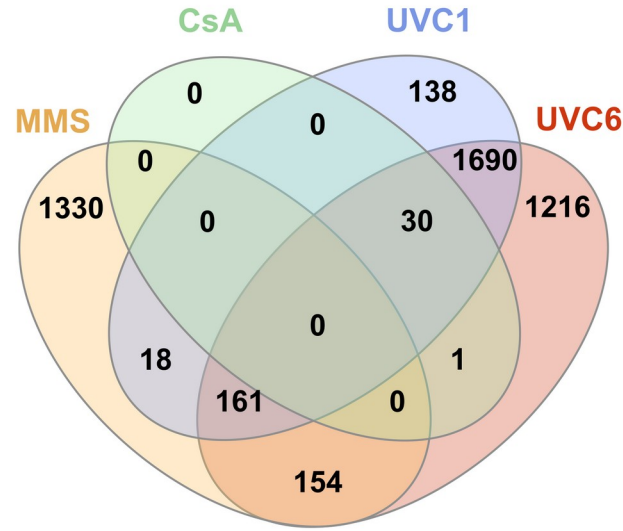


To identify genes with the most impact on stem cell regulation and proliferation control in *M. lignano*, we studied transcriptional profile changes which occur in response to the treatment with chemical and physical carcinogenic factors.





MDS plot of the sequenced libraries



Upregulated genes in treatment vs control lists

RPL24 RPL17
 NEDD8 H2AFV RPS7
 RPS24 PSMB6 SKP1 HSPE1
 TDP2 HSPE1 PSMC2
 BAG3 PSMD1 POLR2F EIF3F
 CCT7 HSPE1 MRPS6 PRMT1
 CCT8 EIF3H RPS17L

Top 23 human homologs in *M. lignano* MMS/UVC1/UVC6 upregulated gene lists among 30 neoblast-specific genes. Other genes appear to be flatworm-specific

`We assumed that genes responsible for carcinogenesis regulation should be upregulated upon the treatments. We focused only on upregulated DE genes, which are specific to the worm's stem cells (neoblasts) and progenitors – the only dividing cells.

`Thus, the list of promising candidate genes for further functional analysis of carcinogenesis regulation mechanism in *M. lignano* was obtained.

Cell type	MMS	UVC1h	UVC6h
Only <u>neoblasts</u>	108	27	34
<u>Neoblasts</u> and progenitors	306	101	144