Marine diatoms are a rich source of bioactivity

Mass production and 1. screening of 15 diatom isolates in 23 assays

Richard A. Ingebrigtsen
Department of Arctic and Marine Biology, UiT - The Arctic University of Norway/MabCent - SFI, Tromsø, Norway

/ BACKGROUND

As part of the MabCent-SFI drug-discovery initiative organized by the University of Tromsø, the coastal areas of northern Norway and the Barents Sea have been investigated (2006-2014). We saw that bioactive compounds from diatoms are very rarely reported (1-4). Therefore we desided that during the initial MabCent research cruises, diatom strains should be isolated and kept in a culture collection and subsequently mass-cultivated in order to investigate their bioactivity by screening the diatom extracts using the Marbio (UiT) assay line.

/ METHODS

Diatom isolates were obtained from water samples in the Barents Sea and mass production of marine diatom biomass was performed in 630 liter columns at Algtech, UiT. The biomass was then freeze dried, extracted and pre-fractioned using HPLC and FLASH - chromatography and all fractions were subsequently tested in the Marbio (UiT) assay line consisting of 23 different assays covering therapeutic areas such as anti - cancer, diabetes II, immunoregulation and anti-bacteria. In addition the anti-oxidant potential was tested.

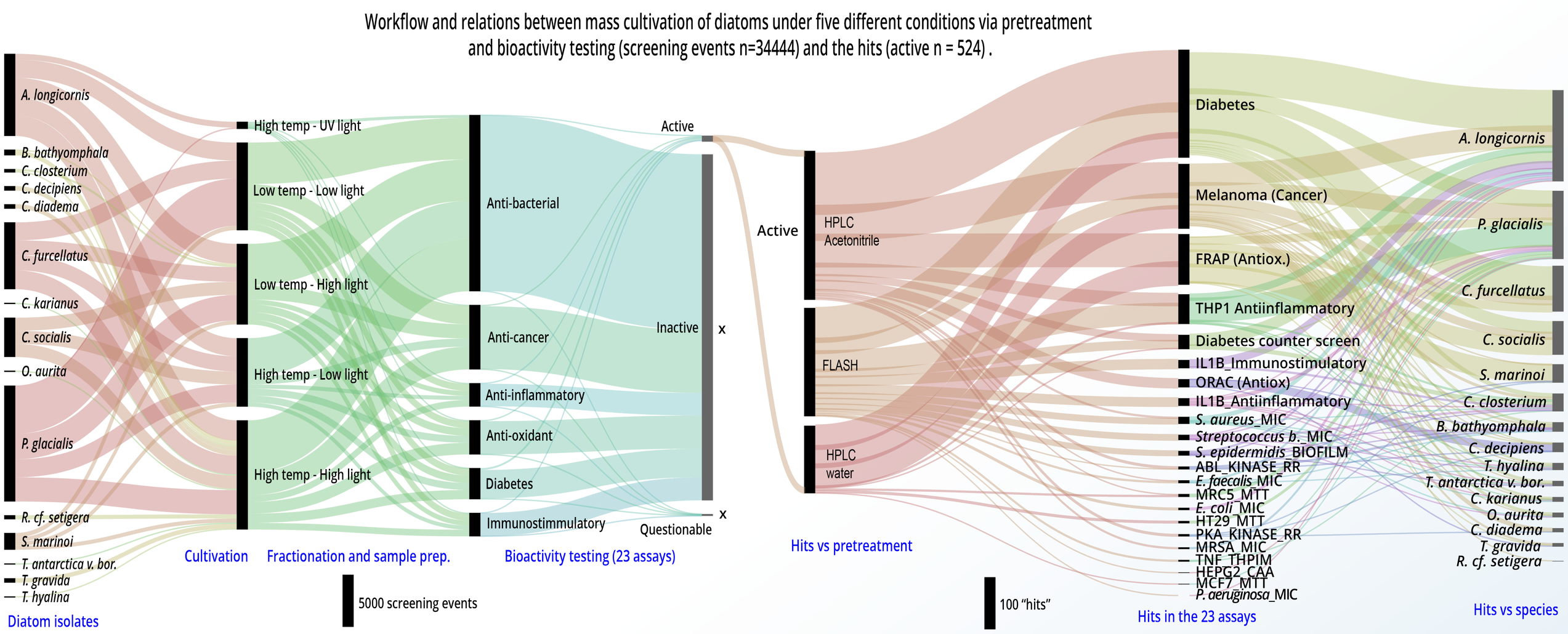

Figure 1. Alluvial plot of the complete dataset showing the connections and relative numbers between species, cultivation conditions and activity. From the middle and to the right the connection between active , chromatographic method, assay and species.

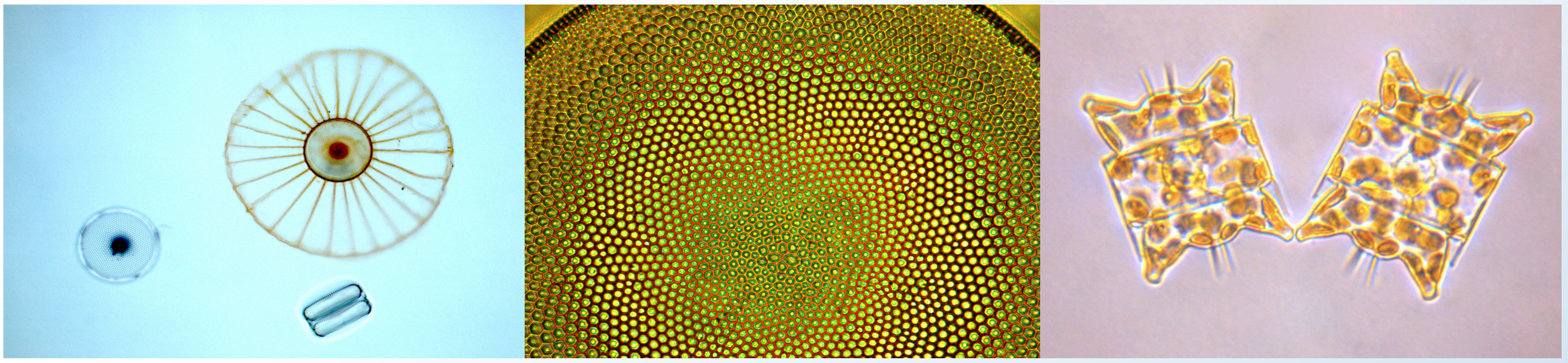

Figure 2. Three marine diatoms from our collection photographed with 400x magnification displaying considerable size and morphological variation. (Photo: R. Ingebrigtsen)

/ RESULTS AND DISCUSSION

We did 34444 tests on fractions of diatom extracts and 524 of these were active. The activity was found in a range of assays. We also found indications of cultivation light and temperature affecting the bioactivity. Diatoms are thus a rich source of bioactivity.

/ CONCLUSIONS AND FUTURE PERSPECTIVES

We need to further investigate the activities we found and de-replicate them (check if it is a known compound producing the activity). Furthermore, it would be interesting to check the effect of e.g. light and temperature on bioactivity.

/ ACKNOWLEDGEMENTS:

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