MSTS Abstract Submission

Full Version

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Number & Title: 11413 - 5-Ala Tumor Paint In Myxofibrosarcoma: An In Vitro Study

Background:

Myxofibrosarcoma (MFS) is a rare subtype of soft tissue sarcoma, infamous for local recurrences, which have been reported as high as 60%. Tumor-free margins following resection are sometimes difficult to achieve, as the tumors often microscopically infiltrate along fascial planes beyond the visible or palpable mass. As a result, these may require multiple re-excisions in order to obtain clean margins on pathology assessment. 5-ALA, a metabolite involved in the heme biosynthesis pathway, has proven to be a relatively safe fluorescent dye which has helped guide intraoperative resection of various other types of tumors, but has not yet been utilized for soft tissue sarcomas. This study analyzes 5-ALA's capacity to target myxofibrosarcoma for fluorescence in an *in vitro* model.

Questions/Purposes:

1) Can 5-ALA selectively cause myxofibrosarcoma cells to fluoresce in an *In Vitro* model?
2) Is 5-ALA concentration dependent?
3) Is 5-ALA time dependent?

Patients and Methods:

The human myxofibrosarcoma cell line (MUG-Myx1, University of Ganz, Austria) was grown in culture and a normal human adipose cell line served as a control. 35,000 cells of each type were isolated and placed into 6 separate wells (12 in total). 5-ALA was added to the wells in 250, 500 and 1000µg/mL concentrations. At 3 and 6 hours post-5-ALA administration, the cells were visualized using a Zeiss Axiovert 200M microscope at 20x, using an excitation wavelength of 395-440nm and an Alexa Fluor long pass emission filter at 470nm. Corrected total cell fluorescence (CTCF) was calculated using ImageJ software.

Results: Fluorescence was observed in the MUG-Myx1 cell line after being treated with 5-ALA. This fluorescence was objectively quantified and found to be significantly higher in the MUG-Myx1 cell line, as compared to the adipose cell line at every tested time point and concentration ($p<0.05$). A near-linear increase in intensity was seen with rising 5-ALA concentrations at 6 hours ($R^2=0.97$). The mean percent rise in CTCF of MUG-Myx1 cells, as compared to control cells at 3 hours, was 481.00% and at 6 hours was 728.00%, however this difference was not significant ($p=.519$).

Conclusions:

This *in vitro* study has demonstrated the ability to effect fluorescence in a myxofibrosarcoma cell line, using 5-ALA. Further studies are planned, using an *in vivo* model to help validate its ability to target a viable tumor in the face of an actively inflamed tumor bed. 5-ALA "tumor paint" has the potential to guide surgical marginal resection of myxofibrosarcoma, with the hopes of decreasing local recurrence rates.

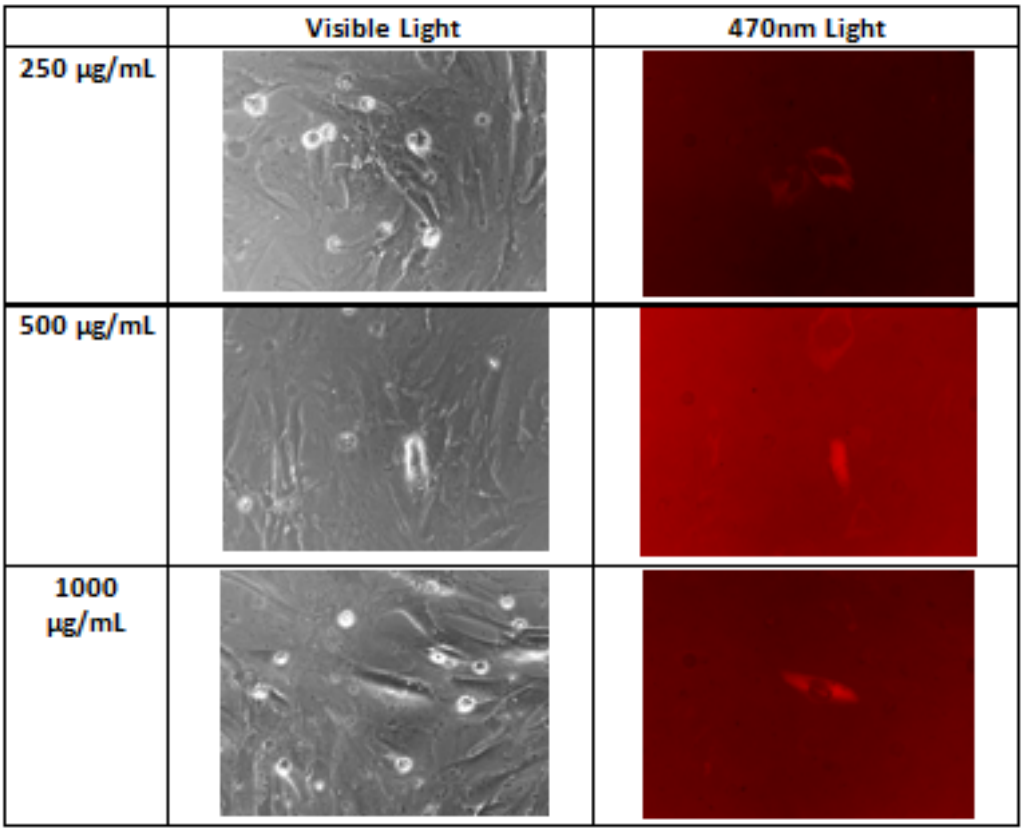

Figure 1: MUG-Myx1 cell line at 3 hours post 5-ALA administration under visible light on left and UV light on right

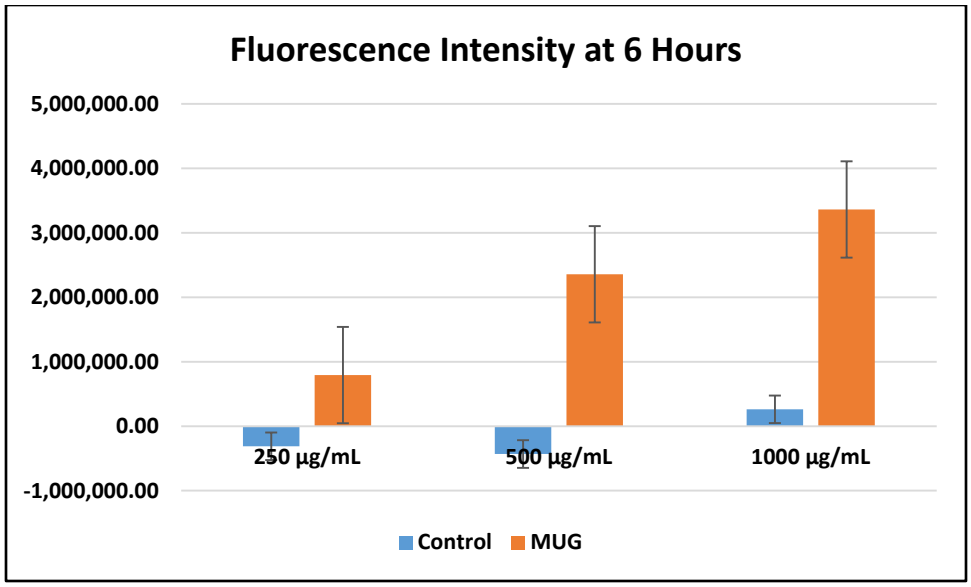

Figure 2: Fluorescence intensity at 6 hours