



Dear Friends,

Welcome to the August issue of Livly's newsletter.

Livly is a young non-profit we formed around the idea of using cells of the innate immune system to combat all sorts of cancer. Livly will draw on the work of others in the field, such as Dr. Zheng Cui, who recently made headlines with the cancer-proof mice he discovered. However, Livly's work will be translational in nature – we work with human cancer-killing cells, and aim to take these basic discoveries forward towards a universal human cancer therapy.

◆ **Corporate**

In July, a new volunteer joined Livly: Johan Knudsen Aardal, who is visiting us from Norway for the next two months. Johan is in the final year of his biology degree, and is helping us with the granulocyte experiments.

Other than that, our organization is up and running effectively. We feel that the absence of other corporate news is good news.

Donations ad

Livly can now receive your tax-deductible donations. Though we have applied for 501(c)(3) status, the paperwork is still being processed by the IRS. For now, tax-deductible donations can be made to Livly through our partner, the Vitae Institute.

Click to donate through paypal, using the Vitae Institute's website

<http://www.vitaeinstitute.org/donate.php>

Our website is live: www.livly.org. You can watch a new cancer killing video there that Johan recorded.

◆ **Science**

The near-term goal of Livly's research was to measure the ability of white blood cells from different individuals to destroy cancer cells. Such a "killing assay" could then be used to discover individuals with exceptional innate cancer immunity. We used to have all kinds of difficulties with getting the necessary equipment together, and getting it to perform in a reliable, high throughput and low-variance manner. These problems have now been overcome, and we have a highly reliable cancer killing assay.

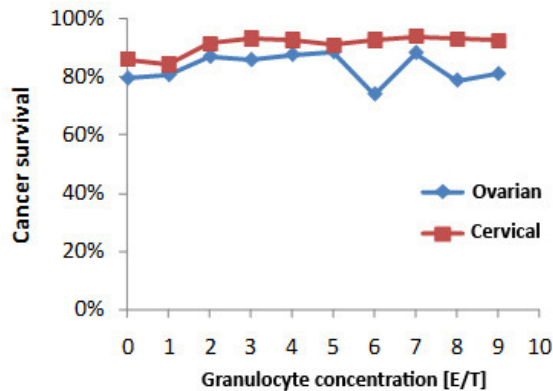
The assay is based on lactate dehydrogenase (LDH), an enzyme normally present inside cancer cells. When a cancer cell dies, its membrane will become compromised, and the LDH will leak into the culture medium, where we can measure it. Thus, the more LDH we find in the culture medium, the more cancer cells will have died. With appropriate controls, this allows us to compute cancer survival curves.

Box: Lactate dehydrogenase

Lactate dehydrogenase (LDH) is the same enzyme that is also found in an exercising muscle cell. Its function is to shift the cell into a metabolic overdrive, where lactate fermentation provides an additional energy source over respiration. This is useful, both to gain extra strength (in the muscle cell) and to power excessive cell replication (in the cancer cell). Granulocytes, on the other hand, have little need for LDH and produce little of it. Thus, LDH leakage into the culture medium is a relatively selective measure of cancer cell death.



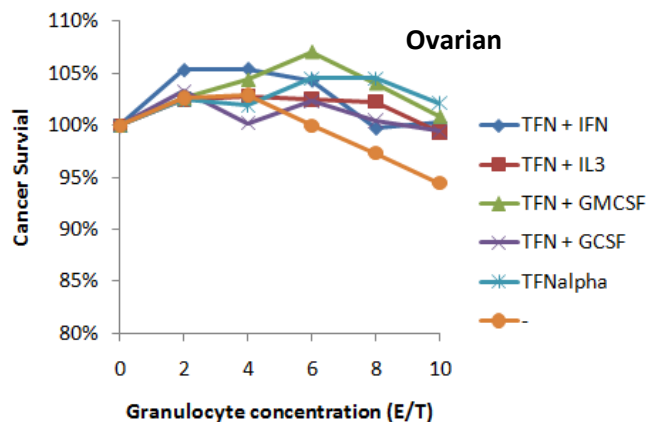
We used the LDH assay to gauge the survival of cancers in the presence of granulocytes:



In these experiments, we exposed cancers to Johan's granulocytes at different "Effector over Target" [E/T] ratios. For example an E/T = 2 means that there are twice as many granulocytes as cancers. If cancers are getting killed by the granulocytes, then we should see less cancer survival with increasing E/T. This is not happening to any detectable extent. Thus, in this experiment, Johan's cells are not killing the cancers.

Even though the result is so far negative, it is great that the curves are smooth and have very little random variability. This shows that our assay is now ready to detect even small amounts of cancer killing, if it did happen. In the future, we need to apply it over and over, to find blood donors or conditions under which killing does occur.

Next, we tried to stimulate the cancer killing activity of Johan's granulocytes by adding various cytokines, words of the chemical "language" that immune cells use to talk to each other. However, in this first attempt, it appeared that the highest killing occurred in the sample not treated with any cytokines (orange) – all our cytokine combinations protected the cancers!



So far, we have not recorded very high killing activity in any individual using the LDH assay. The best we have seen so far using the reliable assay is Johan's cells, which left 5% of the cancers dead. This is consistent with the videos posted at www.Livly.org. We see individual cancer cells being killed, but no wide-spread destruction. We have also not recorded significant activation of the killing activity by the cytokines. However, the above data show that we now have the tools at hand to perform these experiments in a reliable way. We are looking forward to a period of searching individuals and interventions capable of causing significant granulocyte-mediated cancer killing.

Thank you for joining us in this challenge. We absolutely want to hear from you. Questions are encouraged!

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