



Compassionate

Oncology Medical Group

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INTERFERON AND ANTI-ANGIOGENESIS

Dr. Judah Folkman is universally recognized as the pioneer in angiogenesis, and is considered the leading researcher in this exciting field. I feel certain that he will win the Noble Prize in Medicine for his contributions and discoveries regarding the relationships between antiangiogenesis and interactions with cancer growth and/or suppression of cancer growth. In the early 1970's, he was the first to report that in order to grow larger than 2 mm in size, clusters of cancer cells need to develop their own blood supply. He identified and isolated substances produced by cancerous tissue that cause neoangiogenesis (the growth of new blood vessels).

In 1974, I had the privilege to meet Dr. Folkman and work with him during my Harvard Fellowship in Hematology and Oncology. He is a pediatric oncologic surgeon. He was one of my attending doctors during my pediatric hematology rotation at Boston Children's Hospital. I remember him telling me that the secret to controlling cancer was to cut off its blood supply. In my mind, I concluded that since he was a surgeon, he was referring to operating on kids and tying something around the arteries and/or veins that were supplying blood to areas of cancer; another example that shows how ignorant and naive I was (although I did not recognize this at the time). A few years later, Dr. Folkman successfully operated on my cousin (who is still alive).

Later in the 1970's, Dr. Folkman applied his knowledge of antiangiogenesis to treat a rare form of disease that caused massive growth of blood vessels in infants, a condition that had been universally fatal. He treated these infants with interferon, a natural substance made by the body that was antiangiogenic. Interferon could block the malignant growth of blood vessels that afflicted these infants. These babies had to be treated for many years to control their disease but interferon was able to cure patients and was the first successful antiangiogenic agent ever used.

Although I had been treating patients with thalidomide as soon as it was approved in 1998, we did not yet realize that it had powerful antiangiogenic effects. At this time, I was also utilizing a number of other medications that had antiangiogenic effects such as Proscar, Aredia, and Celebrex. In 2001, I began to refer to this form of anti-cancer treatment as an

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antiangiogenic cocktail (AAC). One of the medicines that I routinely included in the AAC was alpha interferon.

However, we did not know the ideal dose to use, and by 2002, I had found how extremely effective Leukine and thalidomide were as cornerstones of the AAC. By 2003, I had pretty much stopped using interferon in the cocktail and tried numerous other agents. However, towards the end of 2006, additional research showed that extremely low daily doses of interferon had more effective anti-cancer properties than higher doses. By this time, we had already investigated many other classes of medications trying them as part of our AAC. These included m-TOR inhibitors like rapamycin; other forms of targeted therapies and antiangiogenic agents including but not limited to Tarceva, Herceptin, Nexavar, Sutent, shark cartilage, resveratrol, and curcumin to see if they helped to control prostate cancer, but were pretty much disappointed with the lack of any obvious and consistent benefits, other than Avastin.

In early 2007, we again began to treat patients with alpha interferon as part of the AAC. The dose we use is only 1% to 4% of the "standard interferon dose" that is used to treat other malignancies or hepatitis C. Instead of using 6 to 18 million units of interferon per day, we only use 250,000 units. So far, our patients have not reported any significant side effects.

Although we are not conducting a prospective randomized double blind study comparing low-dose interferon to placebo, Mary and I have clearly observed obvious PSA declines or slowing of PSA doubling times in a substantial number of patients treated with alpha interferon. We believe the benefit is real, and that very low-dose alpha interferon is more active against prostate cancer than rapamycin, Herceptin, Tarceva, Nexavar, shark cartilage, Sutent, resveratrol, or curcumin. It is not nearly as effective as Leukine, thalidomide or Revlimid, but any time we find a medicine that has a favorable effect on PSA and is well tolerated, we celebrate the accomplishment for what it is - a significant victory!!

Unfortunately, most insurance companies do not accept "anecdotal PSA responses" as enough proof for them to cover the drug. Remember your insurance company is not in business to give you access to promising treatments; they are in business

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to make money. Fortunately, at the dose of interferon that we recommend, a one-month supply should cost you less than \$300.00. And if interferon does not work for you and your PSA rises, it is not likely that you will stay on it for more than a few months. Hopefully, your insurance company will cover the use of alpha interferon for you but if not, hopefully, you will be able to afford a several month trial of this antiangiogenic medicine to see if it can help control your PSA.

ADDITIONAL PRACTICAL COMMENTS FROM MARY AND DR. BOB:

The only version of alpha interferon we recommend is called "Intron-A" and it comes in a multi-dose vial that contains 18 million units in 3 ml of solution. There are other vials that contain more or less than this dose. The unique drug identification number for the 3 ml size, 18 million unit dose of alpha interferon is NDC#0085-1168-01. This version of Intron-A contains a preservative that allows it to be reused for 28 days after you initially puncture the rubber stopper. Discard any vial that has been used or open for 28 days even if you only used one or two doses from that vial. Unopened vials are good until the expiration date on the box as long as it has been refrigerated. This medication should be stored in the refrigerator at all times. Only take it out of the refrigerator when you need to draw up your dose. You will be treated with only 250,000 units of interferon per day. This tiny dose is contained in 0.04 ml (also known as 0.04 cc). On an insulin syringe this equals 4 syringe units. We emphasize that this is a very small amount, almost a droplet. Do not accept any other version of interferon from your pharmacist because the other versions will either not last for 28 days or are too concentrated to achieve the recommended dose.

And, as always --

Be happy,

Be well,

Live long and prosper,

DR. BOB & MARY

****** None of the above should be construed as medical advice or consultation, and anything discussed in this paper is meant for information only. All medical treatments, consultations, decisions and recommendations can only be made by the patient and his/her treating physician. There are side effects associated with all medicines, and the reader is reminded to discuss the risks, benefits, and alternatives of every medication with their prescribing doctor before taking any medicine.

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