Dr. Fred Snyder: Blood Lipid Mediators and Cancer Research at Oak Ridge Associated Universities

(As published in The Oak Ridger's Historically Speaking column on March 1, 2017)

As often happens when the weekly *Historically Speaking* is published, my phone begins to ring with people who have ideas for additional stories based on the one just released. Such was the case with Dr. Fred Snyder. His call was to suggest another scientific program at Oak Ridge Associated Universities. It was a large basic lipid research program running from 1958 to 1995.

So, my first call was to Pam Bonee of ORAU to see what information was available on such a program. She provided several press releases and other information about the program Fred had called me about.

An interesting aspect of this research is that it is not a mainstream type of research activity one would expect to find at a Department of Energy facility. Yet, the early years of such programs encouraged by the Atomic Energy Commission and later DOE in medical related research was important to basic scientific discovery and excelled in bringing new technology to bear on serious and difficult problems.

First let's get to know Fred Snyder before he came to ORAU. He was born in New Ulm, Minnesota, an 1854 settlement of German immigrants. The name, New Ulm, was selected because many of the original settlers were from the Province of Wurttemberg, Germany, of which Ulm is the principal city.

How Fred got his name is a bit unusual. His uncle, named Fred, bribed Fred's parents by offering to buy them a baby crib if they named their baby after him...so Fred Leonard Snyder was born.

Fred grew up in Wabasso, Minnesota, about an hour from New Ulm. Wabasso was a small community of some 600 people, so Fred's high school graduation class had 31 students.

After graduation, Fred attended St. Cloud State University earning a Bachelor of Science. During his senior year, a course in physiological chemistry fascinated him and persuaded him to look into graduate programs in this field.

This led him to the University of North Dakota. A discussion with Dr. W. E. Cornatzer, a professor and head of a newly formed Department of Biochemistry at the Medical School of the University of North Dakota had increased his interest in biochemistry.

Fred obtained a Master of Science degree in Biochemistry and decided to pursue the Ph.D. in Biochemistry. Already having a keen interest in lipids because that was the primary research interest of Dr. Cornatzer who was having a significant influence on Fred at the time and continued to mentor him. Dr. Cornatzer actually helped Fred obtain his job at ORAU. Fred focused on a singular primary path throughout his education and career, lipids. Yet, he has had a broad scientific impact and has served to help many others progress in their careers.

Fred was awarded a Pre-Doctoral Fellowship from the National Heart Institute which would have allowed him to study at the school of his choice. For several reasons including family considerations and Dr. Cornatzer's new program there, he chose to continue his studies at the University of North Dakota. This university has awarded him two additional honorary degrees over the years.

With a Ph.D. in Biochemistry from the University of North Dakota, in 1958, right out of school and ready for his very first real job, Fred's professor advisor, Dr. Cornatzer, knew Dr. Granvil Kyker who worked at ORAU and made the connection for him.

Dr. Kyker was busy doing work on rare earth metals associated with uranium. One of the results of injecting these metals into rats, was that they developed fatty livers. He was looking for a Ph.D biochemist trained in the area of lipid metabolism to help understand why this was happening.

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Lipids are a fatty substance in the blood that are involved in many body processes and were thought to possibly be a key to furthering this research on fatty livers. A perfect fit for Fred. He proudly tells about his excitement with his job at ORAU over the years and with equal pride will tell you that he worked for ORAU for his entire career.

Upon his arrival at ORAU's Medical Division, Fred was impressed with the freedom he was given regarding his continuing lipid-related research. He said, "This one and only job for me was like a hobby since I was able to seek funding from the National Institutes of Health and the American Cancer Society and hire the doctoral and graduate students to help successfully accomplish the goals we developed for our research pursuits."

Additionally, he was asked to serve as an Adjunct Professor at the University of North Carolina and the University of Tennessee. This also provided the opportunity to bring graduate students to ORAU, seven of whom earned their Ph.D's while working there. There were also 23 Postdoctoral fellows who worked for Fred for one to two years coming from coming from France, Egypt, Netherlands, Japan, China, New Zealand, Poland and the United States.

Grants from the American Cancer Society and the National Heart, Lung, and Blood Institute were typical of funding sources. The biochemistry program received approximately \$29 million in grants and DOE funding over the years. Fred has the distinction of holding the longest running American Cancer Society grant at the time of his retirement.

From 1988 to retirement in 1995, Dr. Snyder was an ORAU Corporate Distinguished Scientist. He served on 15 editorial boards ranging from cancer research to biochemistry and biophysics. He was awarded an honorary Doctor of Science degree from the University of North Dakota in 1983.

During those 37 years at ORAU, Snyder and his staff created an internationally known biochemistry program that made several significant contributions in cancer research. One of the more significant ones was the discovery of the platelet-activating factor (PAF) – a mediator involved in allergies and blood pressure control.

An ORAU press release stated, "PAF plays a major role in inflammation, and various physiological areas such as reproduction and blood pressure control. At the time, certain drug manufacturers carried out research to test synthetic compounds for anti-inflammatory and tumor-reducing capabilities based on the structure and function of PAF."

The release continued, "In the late 1960s, the discovery that ether lipids (fatty substances) are more common in cancer cells also marked a significant accomplishment of Snyder and his coworkers. They then learned how cells make these lipids, which provided important information used my numerous other groups in investigating the role of lipids and membranes in cancer."

The highly successful biochemistry program also resulted in annual international conferences being held. One of them was held in Gatlinburg, TN, because of the prestige of the ORAU program and another was held in honor of Fred's 60th birthday. The conference was titled, "The Fred Snyder Conference on 'Structure' Function, & Dynamics of Lipids."

Dr. Snyder was world renowned for his expertise and was often chosen to speak at other international conferences allowing him to travel extensively to many parts of the world. The speaking engagement were so many that he says one such series of conference appointments enabled him to literally travel around the world.

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During his distinguished career, he published more than 350 journal articles, served as editor on four books and presented many invited lectures at both national and international conferences.

Dr. Snyder retired, after 37 years, in 1995 as Vice Chairman of the Medical Sciences Division of the Oak Ridge Institute for Science and Education as well as the Director of the division's Biochemistry Program. He was one of two ORAU Corporate Distinguished Scientists during his career. The other one was Alvin Weinberg.

So, there you have yet another example of an interesting and unique career in Oak Ridge. Fred reminded us of the many and varied opportunities that can come with the type of careers available here in Oak Ridge.

His travels to medical meetings and conferences all over the world, the people with whom he interacted, many of whom he continues to remain in touch through email even today, and the other workers who gained experience because of the biochemistry program at ORAU, all resulted because of one man's interest in a specialized career field of biochemistry. And don't forget the encouragement Fred received from his mentor, Dr. W. E. Cornatzer.



Fred Snyder and Merle Blank in 1979 as the Biochemistry Program at ORAU was gaining international prominence and recognition