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UW RESEARCHER SPOTLIGHT:

Erika Noss, MD PhD



Dr. Erika Noss received her MD and PhD from Case Western Reserve University and trained in rheumatology at the Brigham and Women's Hospital in Boston. She has made important discoveries regarding the regulation of fibroblasts, key cells that are implicated in inflammatory arthritis. She joined the UW Division of

Rheumatology in 2015. We asked her a few questions about her work:

What's one project you are working on these days?

My lab's interest is in how the joint tissue itself responds to injury, since blocking these pathways may provide another way to treat disease. Currently, all approved treatments for rheumatoid arthritis and juvenile idiopathic arthritis directly target the immune system. Although these drugs are effective in many patients, most patients do not go into true disease remission. Because these drugs block the immune system directly, we are limited clinically in the number of drugs we can combine before we markedly increase a patient's risk for infection. Therefore, research is now focused on finding new treatment targets.

We are focused on targeting a non-immune cell resident in the joint, the synovial fibroblast. Normal synovial fibroblasts live in the joint lining, where they make joint lubricants like hyaluronic acid and provide nutrients to cartilage tissue. In rheumatoid arthritis, activated fibroblasts both contribute to inflammation and directly erode away cartilage. Our goal is to understand how fibroblasts become activated in the joint so that we can develop drugs that block their action. Our hope is that drugs targeting fibroblasts can be combined with our currently approved drugs targeting the immune system to provide better treatment efficacy without increasing the risk of infections.

Any results you've found so far that excite you?

Because we study a cell that is only found in joint tissue, our work relies on collaborations with patients and physicians at multiple institutions, including Virginia Mason/Benaroya Research Institute and Seattle Children's Hospital, to provide us with joint tissue and fluid to study.

One recent project done with the assistance of Dr. Jane Buckner and the joint replacement surgeons at Virginia Mason has led us to a new disease area: osteoarthritis. In this study, we applied many of the tools we have developed to study rheumatoid arthritis. In studying joint tissue from osteoarthritis patients, we found that many of the same fibroblast activation pathways found in rheumatoid arthritis are also present in osteoarthritis, including production of the pro-inflammatory cytokine IL-6. We also found early evidence showing that patients with the highest IL-6 were more likely to have undergone a prior joint surgery, suggesting that these patients may be at higher risk of developing damage after joint injury. Our hope is that we can develop this type of analysis into strategies that better target specific types of treatment to the patients that will most benefit from that treatment.

How does your time as a rheumatologist help you become a better researcher?

This question is always difficult for me to explain. To make any progress as scientists, we need to isolate how particular pathways work. Narrowing down our field of focus makes it possible for us to examine how a particular molecule out of many molecules works. The work in the laboratory becomes very specialized. However, when I go and see patients, it always reminds me of how complicated taking care of patients is. It challenges me to focus my research on questions central to the development of joint disease and reminds me why I have chosen a career in both science and medicine.

Learn more about Dr. Noss' research!

<https://rheumatology.uw.edu/faculty/erika-noss-md-phd>

Clinical Trials and Registry Studies Help to Personalize Treatment Decisions

By Jennifer Schaeffer, CCRC

Why does a particular drug work so well for one person but not another with the same disease? The answer may lie within patient-specific factors. *Precision medicine (PM)* refers to the concept of using patient-specific profiles, such as genetics, clinical features, and environmental factors, to assess individual risk and inform disease management strategies. This concept is particularly important in the field of rheumatology, where the conditions we treat are quite diverse in character. Take rheumatoid arthritis, for example – despite our best evidence-based guidelines, we are often still relegated to trial and error strategies in order to find the most effective treatment option, dose strength, or combination that works best in an individual.

The large scale and cost makes PM challenging and expensive to implement, but we can take the goal of PM and apply it to other types of research, such as Phase 4 clinical trials and registry studies, to identify subsets of patients that will respond to particular treatments better.

Phase 4, or “post-market,” clinical trials, are studies using treatments that already have FDA approval for the disease under study. These studies might focus on identifying biomarkers (measurable components in the body) or characteristics of a person that predict how well they will respond to treatment.

The results from these studies help contribute to long-term safety and efficacy data. They also allow for head-to-head comparison of multiple treatment options. Importantly, Phase 4 trials help inform us how well a treatment works in specific populations, such as in kids or underrepresented ethnic groups.

Registries, which record information about the health status of patients longitudinally, also provide an opportunity to apply PM to research. With these disease-specific registries, we can categorize subsets of patients that might respond to specific treatments. We can also use this information to learn more about what causes autoimmune diseases and what factors may contribute to disease severity.

Clinical trials and registry studies deepen our understanding of the diseases that impact our patients by allowing us to develop innovative new treatments and better understand how to maximize treatment effectiveness.

You can find local clinical trials and registry studies that you may be eligible to participate in by going to rheumatology.uw.edu/research/clinical-trials or by searching for studies at www.clinicaltrials.gov.

WANT TO GET INVOLVED IN RHEUMATOLOGY RESEARCH AT UW?

Find available studies on our website at rheumatology.uw.edu/research/clinical-trials
Contact our research group directly at RheumResearch@medicine.washington.edu
or talk to your rheumatologist about getting involved in our research!

FOOD FOR THOUGHT: Can dietary changes help my rheumatoid arthritis?

By Sarah H. Chung, MD

Patients often ask about the impact of diet on rheumatoid arthritis (RA). Currently, good quality data is lacking on the effects of Paleo, ketogenic, South Beach, Atkins, and gluten-free diets on RA risk and disease activity. But the Mediterranean diet (MD), characterized by high consumption of olive oil, unrefined cereals, fruits and vegetables, spices, and a moderate amount of fish, dairy, poultry, and alcohol, might be worth considering. While MD hasn't proven to prevent RA, several studies suggest that adopting this diet may significantly reduce pain and inflammation in patients with established RA. It's also favored because it's nutritionally well-rounded, not very restrictive, and thus generally easy to adhere to.

The key appears to be in the omega-3 fatty acids (FAs), which modulate the constitution of cell membranes and serve to decrease the production of pro-inflammatory mediators in the body. In-vitro studies have also shown that omega-3 FAs promote the conclusion of inflammatory responses, inducing so-called “specialized pro-resolving mediators” (SPMs), akin to a clean-up crew that starts to clear out the trash when it's time for the (inflammatory) party to wind down.

These special fats are primarily obtained from oily fish as well as poultry, nuts, and berries. Fatty fish and fish oil supplements contain 2 types of omega-3 fatty acids, both of which our bodies can't synthesize (and thus we rely on from the diet): eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Some studies have demonstrated that fish consumption (≥ 2 times weekly) and omega-3 fatty acid supplementation (≥ 3 grams daily EPA plus DHA) in conjunction with medical therapy improves the number of tender and swollen joints in RA patients, as well as serum levels of C-reactive protein, a marker of systemic inflammation. Plus, there's the added bonus of improved cardiovascular health, particularly in RA patients who already have an increased risk for heart disease. At any rate, it's a delicious way to eat and might be worth a try!

