Our project explores how combining induced piezoelectric signals from electrospun polymer fibers with cholesterol can shape keratinocyte behavior. This approach aims to ease inflammation linked to psoriasis while uncovering how piezoelectric cues influence cells at the molecular level. By integrating these two factors, we hope to refine methods for reducing inflammatory states and regulating keratinocyte function.

**Why It Matters:**
This work goes beyond psoriasis. By leveraging piezoelectric fibers and cholesterol, we introduce a dual strategy that could transform biomaterials and dermatology, and even guide innovations in tissue engineering and regenerative medicine. Such insights may lead to advanced materials capable of steering cell responses, ultimately improving patient care across a wide range of medical applications.

**How We're Doing It:**
First, we will produce and characterize fibers with controlled piezoelectric properties. Next, we will induce inflammation in keratinocytes to observe how piezoelectric signals shift cellular pathways and reduce inflammatory markers. Adding cholesterol to the system will help us determine whether this combination can further calm inflammation and influence keratinocyte growth and maturation. Throughout the process, we will carefully study the underlying biological mechanisms, clarifying the precise interplay between piezoelectric effects and cholesterol uptake.

**Potential Impact:**
Our findings offer more than just new data—they provide a blueprint for designing treatments that directly shape cellular environments. By decoding how piezoelectric signals and cholesterol interact, we can foster more effective strategies against inflammation, potentially revolutionizing psoriasis therapy and inspiring breakthroughs in broader biomedical contexts.

**The Future:**
Piezoelectric cues represent a new frontier in medical innovation. Coupled with cholesterol's beneficial effects, they could allow us to fine-tune how cells behave and respond to their surroundings. This research lays the groundwork for tomorrow's materials and therapies ones that not only control inflammation more precisely, but also speed healing and regeneration, ultimately improving patient outcomes across many fields.