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Some ground and excited state interactions among extracellular matrix, simple sugars and type I collagens in the dermis

Dermal collagen and the surrounding extracellular matrix (ECM) have been described as the respective "bricks and mortar" of mammalian skin. Proteoglycans are glycosylated proteins with covalently attached anionic sulfated glycosaminoglycans (GAG). These in turn are attached to a hyaluronate (HA) backbone. Although the ECM macromolecules are best known for their architectural support of tissues, recent work indicates other important cell functions e.g., the ECM and collagen are both susceptible to environmental that can result in altered properties. We have arbitrarily divided the ECM into two sections: (1) The collagen: PG complex itself, including the external membrane-bound PG, (e.g., aggrecans and decorin) and (2) The perturbations caused by the effects of the surrounding internal and external environment. Examples are age, mechanical loading, ECM disruption, internal and external effects of UV, temperature and glycation by abnormal amounts of simple sugars. We are interested in the effects of UV radiation on type I collagen. In simple *in vitro* work, UV causes collagen concomitant degradation and cross-linking that changes its basic properties and results in abnormal fibers, altered gelation and fluorescence properties, altered photochemical kinetics and altered susceptibility to collagenase. More recently, we have commenced a study of the effect of hyaluronate on collagen photochemistry. Using a model *in vitro* system of collagen-HA 1:2 mixtures For T<Tm (~36 C) HA retards the rate of photolysis by ~20-30%. At T>Tm, where the coiled form predominates, there seems to be no such effect. Thus, stabilization of collagen helical structure seems to be one important function of the ECM. We envision further studies with added model proteoglycans.

Biography

Julian M Menter has received his PhD degree in Chemistry from the George Washington University in 1969. He has completed a Post-doctoral Fellowship with Professor Doctor Theodor Foerster at the Institut fuer physikalische Chemie der Universtiaet Stuttgart, Germany. Subsequently, he was at the University of Alabama, Birmingham and the VA Medical Center, Atlanta. He currently serves as a Research Professor of Biochemistry at Morehouse School of Medicine. He is recognized internationally for his work in the areas of collagen photochemistry and melanin photobiology as pertaining to redox reactivity.

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