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Effect of Dioclea grandiflora DGL-II lectin on human epidermal keratinocyte proliferation and migration: Relationship with its glycotope specificities

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Statement of problem: Impaired or delayed re-epithelialization during wound healing represents a medical problem in many organs. Keratinocyte migration and proliferation are the most relevant events in skin re-epithelization. The present study purpose was to observe the effect of DGL-II on the proliferation and migration in human epidermal keratinocyte cell line HaCat; likewise, on the combined approach basis, to make a parallel of similarities and disparities between glycotope ligands for this plant lectin with those for mammalian galectin-3 (LGALS3), taking into account that the latter promotes re-epithelialization under natural and in vitro conditions.

Methodology & Theoretical Orientation: DGL-II purification was carried out by lactose affinity as previously described. MTT, trypan blue dye exclusion viability and cell migration (scratch) assays were performed in presence of DGL-II. A comparison between ligands for DGL-II and for LGALS3 was made.

Findings: DGL-II showed a pro-proliferative effect in the same concentration range as did LGALS3, as well as, it increased the rate of scratch width closure in the monolayer compared to the control. DGL-I, another lectin from the same plant but with different specificities, did not. DGL-II and LGALS3 recognize structures containing the same glycotopes (e.g. IIβ and Neuα2,3Gal). Exposed α-linked galactose and fucosylation can affect interactions. Some ligands shared by DGL-II and LGALS3 are part of membrane glycoconjugate structures involved in proliferation and migration of molecular signaling.

Conclusion & Significance: DGL-II increased keratinocyte proliferation and migration rate within the range of concentrations in which exogenous LGALS3 did it, and shows similar specificities to this mammal galectin. This makes us think that DGL-II could increase the rate of closure and recovery of skin lesions. We have the perspective to observe the DGL-II effect on the expression of molecules involved in cell proliferation and migration, as well as to evaluate it as a skin treatment in mammal model.

Biography

The main contributions I have provided during my career and my research has to do with that organ that surrounds and covers us like we were gifts: Our skin. I had the opportunity to investigate about the host-parasite relationship, changes at the cellular level and mechanisms of action of drugs and vaccines against a disease that produces skin ulcers: cutaneous leishmaniasis. Then, I was working for a company for skin care products where I could evaluate in vivo and in vitro efficacy and safety of skin products. Currently, I am developing my doctoral thesis "Effect of plant lectins on proliferation and migration processes in epidermal keratinocytes", at the National University of Colombia.

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