**Establish a Living Transgenic Zebrafish to Visualize Skin Damage and Repair**

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Fish skin is organized by the superficial enveloping and underlying epidermal layers. Unlike its mammalian counterparts, the outmost skin layer in fish is organized by living cells and directly exposure to the external stress. In the previous reports, several lines of evidence showing the skin cell turn-over rate and repair process are extremely fast in fish. However, due to the technical limitation, it is very difficult to remove all superficial skin layers and observe how skin repair from the underlying stem cell pools. To achieve this goal, we used a superficial skin specific promoter (krt4) to drive suicide gene of nitroreductase (NTR) and establish a transgenic line of Tg(*krt4:NTR-hKikGR*)cy17.NTR is a non-toxic reductase which originally isolated from *Escherichia coli*. However, when exposure to prodrug of metrodinazole (Met), NTR can convert Met into toxic metabolite and behave as a DNA interstrand cross-linking agent to induce cell apoptosis. In Tg(*krt4:NTR-hKikGR*)cy17, we noticed the NTR-hKikGR fusion proteins are translocated into centrosome and makes us possible to evaluate the cell number and density of keratinocyte before and after cell ablation at the single cell resolution. When Tg(*krt4:NTR-hKikGR*)cy17 exposure to Met, all the superficial skin displayed extensively damages and apoptosis, and accompanied with a great reduction of NTR-hKikGR+ fluorescent signals. However, when Met was withdraw, we are able to see the skin integrity and NTR-hKikGR+ fluorescent signals are restored. This result demonstrated that the fluorescent appearance of NTR-hKikGR+ signals is a reliable marker to trace the superficial skin integrity *in vivo* at both embryonic and adult stages. Next, we explored whether Tg(*krt4:NTR-hKikGR*)cy17 can be applied to evaluate the potential effect of survival signaling on skin. In either p53 knock-down, Akt1 or Stat3 overexpression background, we are able to see the skin cell lose is attenuated when Tg(*krt4:NTR-hKikGR*)cy17 is administrated with Met. Take together, the novel transgenic line of Tg(*krt4:NTR-hKiKGR*)cy17 provides a living tool to visualize skin damage, repair and underlying mechanism in zebrafish for the first time.