adenoviruses expressing Cre recombinase. These mice were injected weekly intraperitoneally with urethane in order to promote cancer development. To better understand geminin's role in cancer and cellular differentiation, we used a BAC construct harboring the complete mouse geminin gene, fused to GFP. The construct was then modified using recombineering and introduced into mouse embryonic stem (ES) cells (ESGemGFP) by transposition. Proteomics analysis will be performed in extracts derived from the modified ES cells (ESGemGFP) in order to identify protein complexes in which geminin participates in order to regulate cell cycle and differentiation.

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ROLES OF CAVEOLIN-1 AND CYCLOOXYGENASE 2 IN KIDNEY, URETER, BLADDER AND PROSTATE CANCERS

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High expression of cyclooxygenase 2 (Cox-2) and caveolin-1 (Cav-1), which play a regulatory role in hormonal metabolism and signaling pathways respectively, are positively correlated with higher risk, cell metastasis capacity and poor prognosis; however, the contribution of Cav-1 genetic variants during carcinogenesis is still largely unrevealed. In this report, we will summarize the updated findings of Terry Fox Cancer research laboratory in Taiwan focusing on the genomic contribution of polymorphisms on COX-2 [G-1195A (rs689466), G-765C (rs20417), T+8473C (rs5275), intron 1 (rs2745557), intron 5 (rs16825748) and intron 6 (rs2066826)] and CAV-1 [C521A (rs1997623), G14713A (rs3807987), G21985A (12672038), T28608A (rs3757733), T29107A (rs7804372) and G32124A (rs3807992)] to urological cancers in Taiwan. The overall investigations in four cancers, including renal cell carcinoma (kidney cancer), ureter, bladder and prostate cancers will be summarized and discussed. Novel biomarkers are useful for further studies in other populations and the mechanism behind their targeting are needed in personalized pharmacogenomics.

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IN VIVO IMAGING OF ANTITUMOR LYMPHOCYTES

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One of the most promising modalities for non-invasive imaging of small animals is bioluminescence imaging. Bioluminescence imaging is based on the sensitive detection of visible light produced during luciferase-mediated oxidation of a molecular substrate (D-Luciferin) when luciferase is expressed *in vivo* as a molecular reporter. Photons are detected by specialized charge-coupled device cameras that convert photons into electrons. Bioluminescence at the emission wavelength of firefly luciferase (560 nm) can be imaged as deep as several centimeters within tissue, which allows at least organ-level resolution. Bioluminescence imaging is remarkably sensitive, enabling detection of, as few as, 10 cells *in vitro* and 100-1,000 cells *in vivo*. Light producing transgenic animals (LPTA®) are an excellent source of luciferase-expressing cells in cell transfer experiments. The β-actin promoter provides strong constitutive expression of luciferase in most tissues of the mouse, including lymphocytes. β-actin-luc mice can be used as lymphocyte donors in studies of the antitumor effect in lymphocyte-deficient tumor-bearing recipients. Whole-body images revealing location of lymphocytes can be obtained at different time points after lymphocyte transfer. This approach allows to define the time points and sites of lymphocyte infiltration. In addition, proliferation of transferred lymphocytes can be estimated by quantitation of photon emission. In our experiments, β-actin-luc mice were challenged with SL2 tumor in order to generate luciferase-expressing T lymphocytes sensitized against the SL2 tumor antigens. Adoptive transfer of these lymphocytes cured lymphocyte-deficient SL2 tumor-bearing Rag2 mice. The results of bioluminescence imaging suggest that adoptively transferred T lymphocytes proliferate within secondary lymphoid organs of the recipient mouse and infiltrate the tumor. After rejection of the tumor, memory T lymphocytes reside in the spleen and other secondary lymphoid organs for prolonged periods of time (months).

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ACTIVATING BRAF AND PIK3CA MUTATIONS COOPERATE TO PROMOTE ANAPLASTIC THYROID CARCINOGENESIS

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