Visualization of immune response to hepatitis B vaccination by \textit{in vivo} small animal imaging

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By taking advantage of bioluminescence imaging to monitor luciferase expressing splenocytes from the luciferase transgenic mouse, we visualized the enhancement of immune response against hepatitis B virus (HBV) vaccine with adjuvants. To visualize antigen \textit{in vivo}, large hepatitis B virus antigen (L-HBsAg) was labeled with radiiodine (125I). B6 mice were intramuscularly vaccinated. The localization of 125I-L-HBsAg was monitored for 5 weeks using animal SPECT/CT. To monitor the immune response, the luciferase expressing splenocytes were injected intravenously into immunized B6 mice. Bioluminescence signals from splenocytes were measured by IVIS 100 system. Localization of inoculated L-HBsAg was successfully monitored using animal SPECT/CT. L-HBsAg was lasted for 5 weeks and diminished. In addition, the injected splenocytes were successfully visualized in immunized mice, homing to spleen within 30 minutes and were accumulated in lymph nodes within 5 hours. Accumulation of splenocytes at vaccination site was observed within 24 hours. Moreover, after 10 hours, mouse vaccinated with antigen and two adjuvants showed 4 times more accumulation of splenocytes at vaccination site compared to mouse vaccinated with antigen only. Six days later, mouse vaccinated with antigen and two adjuvants showed 1.7-4.73 fold increased luciferase intensity of splenocytes at spleen, lymph nodes and vaccination site compared to mouse vaccinated with antigen only. In conclusion, \textit{in vivo} real-time bioluminescent monitoring of splenocytes homing and proliferation against vaccination successfully provides efficiency of adjuvants. Our imaging system can be used for evaluation of efficacy of vaccination by enhanced the proliferation and activation of splenocytes near the vaccination site.

Biography

Hyewon Youn has completed her PhD from Texas Tech University and Postdoctoral studies from Southwest Cancer Center in TX, USA. She serves as a Professor in Seoul National University and a Board Member of Korean Society of Nuclear Medicine. She has published more than 70 papers in reputed journals and has been serving as an Editorial Board Member of \textit{Nuclear Medicine and Molecular Imaging}.

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