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Humoral and Cytokine Responses to Major Human Cytomegalovirus Antigens in Mouse Model

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Abstract : Human cytomegalovirus (CMV) continues to be a source of severe complications in immunologically immature and immunocompromised hosts. Effective CMV vaccines that help diminish CMV disease in transplant patients and avoid congenital infection are of great importance. Though the exact roles of defense mechanisms are unidentified, viral-specific antibodies and cytokine responses are known to be involved in controlling CMV infections. CMV envelope glycoprotein B (UL55/gB), matrix proteins (UL83/pp65, UL99/pp28, UL32/pp150), and assembly protein UL80a/pp38 are known to be targets of antiviral immune responses. We immunized mice intraperitoneally with these five CMV-related proteins (commercial) for their ability to induce specific antibody responses (in-house immunoassay) and cytokine production (commercial assay) in a mouse model. We observed a significant CMV-antigen-specific antibody response to pp38 and pp65 (E/C ˃2.0, p˂0.001). Mice immunized with pp38 had significantly higher concentrations of GM-CSF, IFN-α, IL-2 IL-4, IL-5, and IL-17A (p˂0.05). Mice immunized with pp65 showed significantly higher concentrations of GM-CSF, IFN-γ, IL-2 IL-4, IL-10, IL-12, IL-17A, and TNF-α. Th1 to Th2 cytokines ratios revealed a Th1 cytokine bias in mice immunized with pp38, pp65, pp150, and gB. We suggest that stimulation with multiple CMV-related proteins, which include pp38, pp65, and gB antigens, will allow both humoral and cellular immune responses to be efficiently activated, thus serving as appropriate CMV antigens for future vaccines.

Keywords : cytomegalovirus, UL99/pp28, UL80a/pp38, UL83/pp65, UL32/pp150, UL55/gB, CMV-antigen-specific antibody, CMV antigen-specific cytokine responses
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