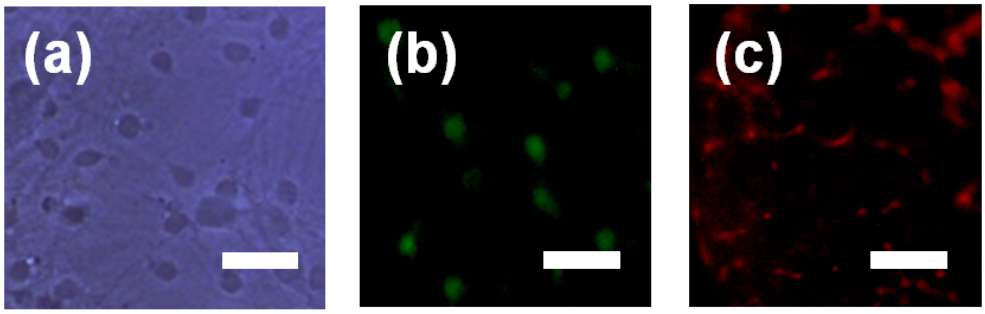

Fig. 6. Microscope images of neuron cells fixed on a glass substrate. (a) Bright field image. (b) Distribution of the presynaptic protein synaptophysin labeled by Alexa Fluor 488. (c) Labeling of dendrites and cell bodies using Texas Red with MAP-2 primary antibodies. Scale bar = 50 μm.

4. Conclusion

In this study, we demonstrate the proof-of-concept for multi-color fluorescence imaging through a combination of plasmonic wavelength splitter and double illumination by white light. A large-area SiO_2 grating of Λ = 400 nm and d = 100 nm is successfully realized using nanoimprint lithography and shows a fairly good performance in terms of color selectivity. While the diffraction efficiency for shorter wavelengths needs be improved, green and red fluorescence signals are efficiently produced only for TM polarization, which implies that fluorescence emission is accompanied by an excitation of surface plasmons. Moreover, although very preliminary, we confirm the feasibility of the proposed scheme by visualizing biological samples from fluorescence experiments for cultured neuron cells and therefore expect its potential for integration with SPR biosensing scheme to realize a multi-functional platform which allows imaging and sensing of biological samples at the same time.

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