Supporting Information

1. Formation and Characterization of Micelle-Containing LbL Films

LbL films of PPO-PAMAM G4·Pyrene/PAA and LPEI·Pyrene/PAA were analyzed with a fluorimeter. A typical spectrum for pyrene was obtained for the PPO-PAMAM G4·Pyrene/PAA film, while no spectrum was seen for the LPEI·Pyrene/PAA film (Figure S1). This indicates that the PPO-PAMAM G4·Pyrene/PAA film has hydrophobic components that allow for incorporation of pyrene while the LPEI·Pyrene/PAA film does not.

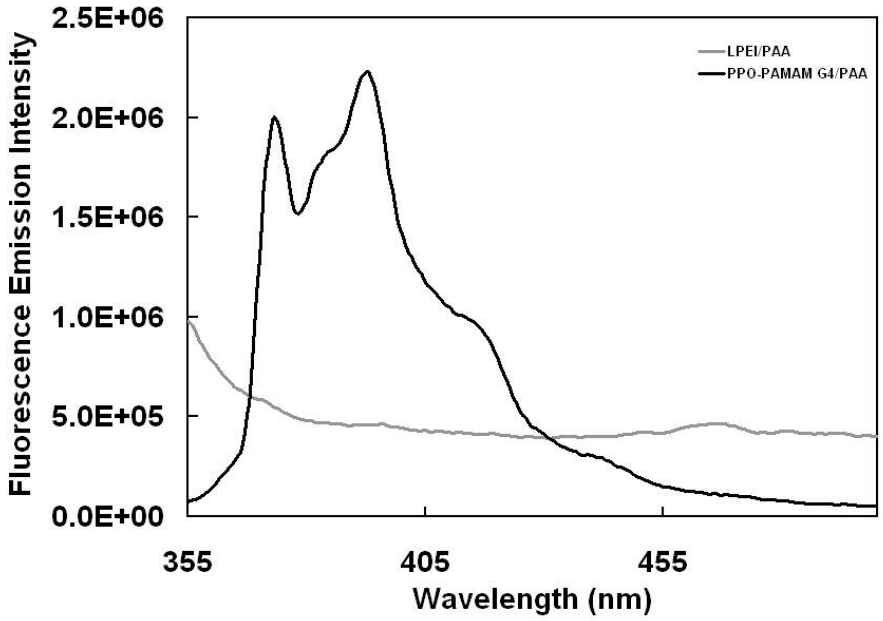

Figure S1. Pyrene emission spectra of LPEI/PAA films and PPO-PAMAM G4/PAA films.

Films composed of either PPO-PAMAM G4/PAA or PPO-PAMAM G4·triclosan/PAA after the drug had been released were analyzed with FTIR (Figure S2). The spectra indicate that PPO-PAMAM remains in the LbL film after drug release experiments. There are peaks at 1650 and 1570 cm^{-1} indicating the presence of the amide groups in the PAMAM block.

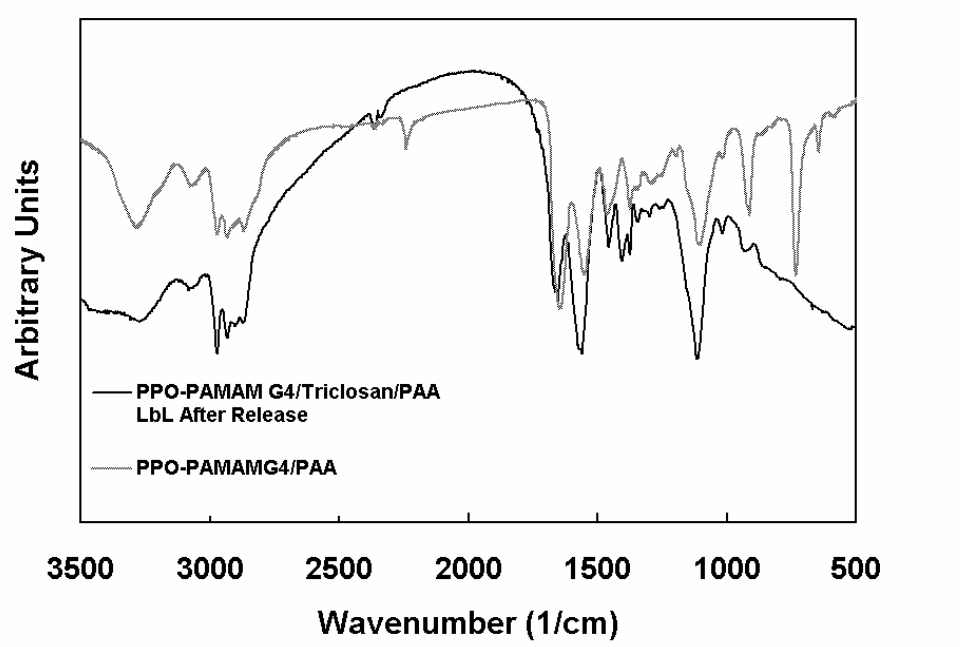

Figure S2. FTIR spectra of PPO-PAMAM/PAA films after triclosan release or PPO-PAMAM/PAA films fabricated with no drug.

2. Drug Release and Efficacy

The data presented in Figure 8 was fit to a thin film release model. The equations used were:

$$\frac{\partial \Theta}{\partial \tau} = \frac{\partial^2 \Theta}{\partial \zeta^2}$$

where $\Theta = C/C_0$, $\tau = Dt/L^2$, $\zeta = y/L$, C is the concentration of drug in the film, C_0 is the initial concentration, D is the diffusion coefficient, t is time, L is the thickness of the film, and y is the distance into the film. The initial conditions used to solve the equation were:

$$\Theta(\zeta = 1, \tau) = 0$$

$$\Theta'(\zeta = 0, \tau) = 0$$

$$\Theta'(\zeta, \tau = 0) = 1$$

The initial conditions assumed that the aqueous solution was always dilute, which we maintained by switching the samples to new buffer frequently. The model obtained from solving the equation was:

$$\Theta = \sum_{n=0}^{\infty} \sqrt{2}\cos(n+0.5)\pi\zeta \cdot e^{-[(n+0.5)\pi]^2 \tau}$$

Taking the first term with n = 0 and averaging Θ over the thickness of the film to obtain an average film concentration, the drug release data was then fit to the following model:

$$\overline{\Theta} = \frac{2\sqrt{2}}{\pi} e^{-\left(\frac{\pi}{2}\right)^2 \tau}$$

Note that the data in Figure 8 plots the normalized drug concentration that was released from the film, which had to be converted to the normalized drug concentration remaining in the film. From the model, the equation obtained was $\overline{\Theta} = 1.05e^{-0.01023\tau}$, with a D equal to 7.28 x 10^{-15} cm^2/s. This diffusion coefficient is within the range for a drug diffusing through a polymer.