Supplementary information to "Sustained delivery of MGF peptide from microrods attracts stem cells and reduces apoptosis of myocytes**"**

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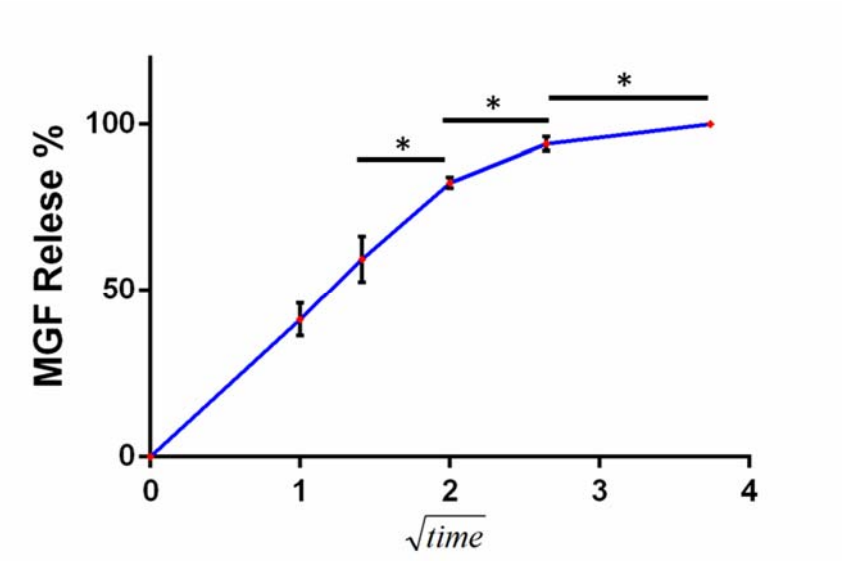

Supplementary Figure 1 Time course of elution of MGF from the microrods detected by HPLC method fits with Higuchi model. The cumulative MGF was measured at 0, 1, 2, 4, 7, and 14 days. Each measurement was normalized to the 14 day MGF release. Mean± SE, n=5, * $p < 0.05$

Supplementary Discussion:

Further discussion on the MGF elution shown in **Supplemental Figure 1**:

Basic assumptions of the Higuchi equation was applied for a slab geometry of a monolithic dispersion to describe the release kinetics that was observed experimentally (**Supplementary Fig. 1**). Here it was

assumed that the MGF is present at a high concentration within the microrods and dissolves in solution over time as it is hydrated by the water absorbed by the microrod. We have also assumed uniform distribution of the drug within the polymer matrix and a constant diffusion coefficient throughout the course of dissolution from the microrod. Under these assumptions, the elution of MGF from the collection of microrods that act as monolithic dispersions can also be described by the equation:

$$M_t = A\sqrt{DC_s(2c_{ini} - 2c_s)t}$$

This equation takes into consideration the surface area, *A*, diffusion coefficient, *D*, initial drug concentration, c_{ini}, and drug solubility in the matrix, c_s, to describe the total drug released, M_t, with respect to time, *t*. With the assumptions state above, this can be simplified to a constant relationship with time as:$M_t = k\sqrt{t}$

where k is the amalgamated constant of the other factors that dictate MGF release. Applying this model to our elution data by plotting the total drug released against the square root of time (while excluding data points beyond 14 days, at which point there is no further detectable release of MGF), reveals a linear relationship consistent with this model with $R^2 = 0.9$ up to day 7. This suggests that our drug elution profile closely matches that of a monolithic dispersion with MGF being dissolved in solution from a large hydrogel-bound reservoir that is wetted as the water pervades the matrix, and can be well predicted and characterized based on empiric data. Interestingly, the consistency with the model does seem to deviate towards the end of our detection ability at 14 days, suggesting that the last remnants of MGF in the matrix may be restricted in their diffusion ability from the matrix due, for example, to more complete sequestration in the polymer matrix, which is consistent with the methods we have used to incorporate the peptide in the devices.