**Supplementary Figure 1.** The Arches cluster, as imaged in infrared light with the *Hubble Space Telescope Near-Infrared Camera and Multi-object Spectrometer*[1]. The image is a color-composite of three images obtained in wavebands centered on 1.10 µm (*blue*), 1.60 µm (*green*), and 2.05 µm (*red*). Most of the bright white stars near the center of the image have M~120 $M_\odot$. Blue stars are in the foreground.
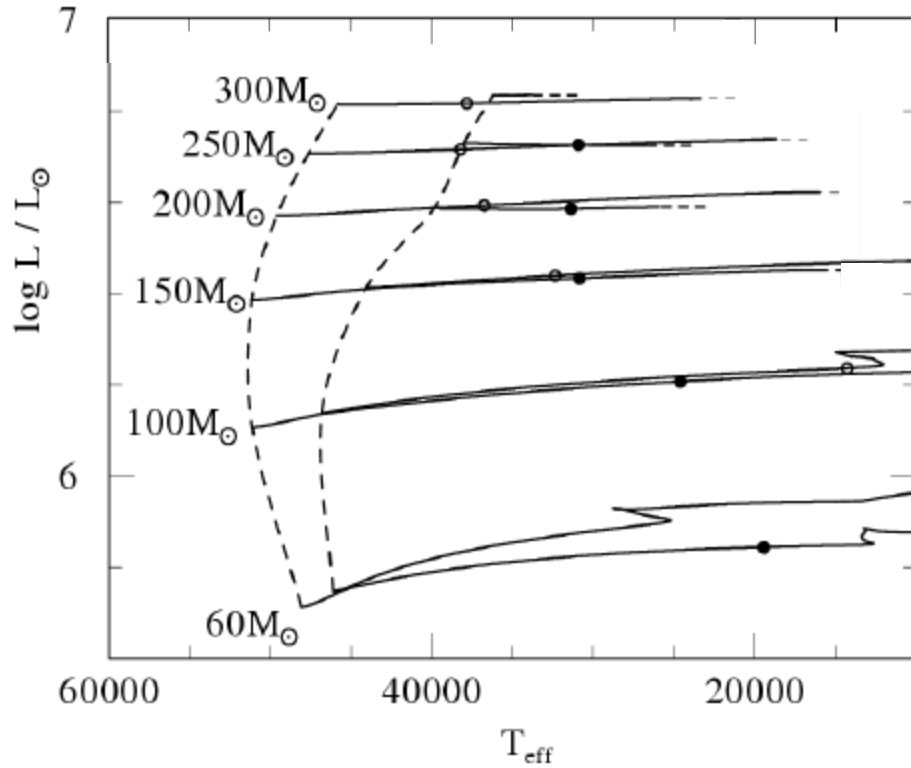
Supplementary Figure 2. Luminosity versus temperature for massive stars[1].

Initial masses for the zero-age main sequence (vertical dashes) are labeled.

The horizontal lines mark the evolutionary progressions for the stars, generally

from left to right over time scales of a few Myr. The leftmost set of tracks are for

solar metalicity and the rightmost set are for twice solar metalicity. The circles

mark where the nuclearly processed material reaches the surface – filled circles

belong to the twice solar metalicity tracks and open to the solar metalicity

tracks. The ends of the tracks designate where the outer atmosphere becomes

unbound by gravity against radiation pressure. In general, these tracks provide

good concurrence with the Geneva models at the low mass end of the range[3].
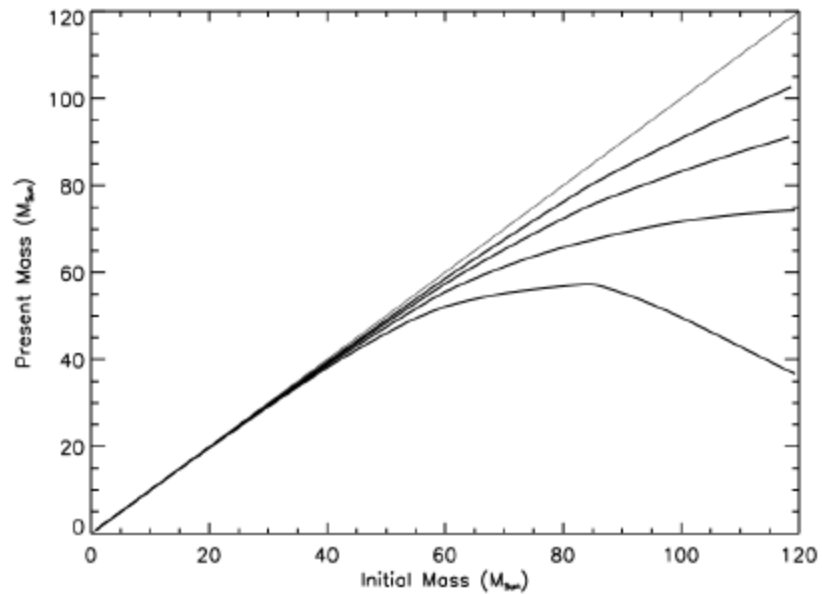
Supplementary Figure 3. Present versus initial mass for massive stars at a variety of ages. The thin line corresponds to zero age, i.e. the present mass is the initial mass. The next four curves, from top to bottom, correspond to τ_{age}=1.0, 1.5, 2.0, and 2.5 Myr. The curves assume solar metalicity and the Geneva stellar evolution models[3]. Note that for the oldest stars, the most massive stars have evolved to masses that are less than those for stars with less initial mass, and effect produced by the prodigious mass-loss during the Wolf-Rayet phase of stellar evolution.
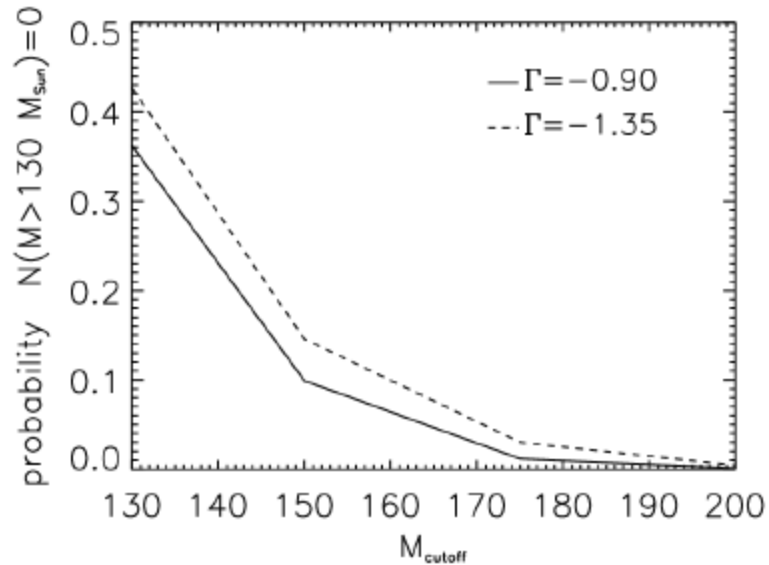
Supplementary Figure 4. Results of Monte-Carlo simulation. The plot shows the probability distribution of systems with no stars having initial masses greater than 130 $M_\odot$ versus the mass of the upper mass cutoff. The simulation uses 60,000 systems, each with test points having a mass distribution that follows a single power law initial mass function truncated at the cutoff. The Geneva stellar evolution models are used to convert intial masses into dereddened magnitudes, m_K, assuming an average age of the system and a small variation in that age for each particle; the average system ages are 2.1, 2.2, 2.3, and 2.4 Myr, with equal probability, and each particle is assigned a variation of −0.1, 0, and 0.1 Myr, with equal probability. Further, the assumed average age of the cluster is allowed to vary through a uniform and random distribution spanning the range of initial system ages. Each test point is assigned an extinction drawn from a Gaussian distribution having a mean of A_K=3.1 and σ=0.2. A photometric

error is also applied, as drawn from a Gaussian distribution with a mean of zero and σ=0.1. Finally, the distance modulus appropriate for the Galactic center is applied to arrive at apparent magnitudes. These apparent magnitudes are then treated just as the observations in order to infer initial masses. The plot shows that model clusters with upper mass cutoffs above 130 $M_\odot$ tend to have stars with initial masses greater than this mass. The probability of inferring the presence of zero stars with initial masses greater than 130 $M_\odot$ (as is observed) for a model cluster with a cutoff of 150 $M_\odot$ is approximately 10%.

1. Figer et al., HST/NICMOS observations of massive stellar clusters near the Galactic center. *Astrophys. J., ***525,** 750-758 (1999)

2. Figer, D.F. et al., The Pistol star. *Astrophys. J.*, **506**, 384-404 (1998)

3. Schaller, G., Schaerer, D., Meynet, G., & Maeder, A., New grids of stellar models from 0.8 to 120 solar masses at Z=0.020 and Z=0.001. *Astron. Astrophys. Supp.*, **96**, 269-331 (1992)