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The cellular biology of muscle helps to explain why a particular athlete wins and suggests what future athletes might do to better their odds

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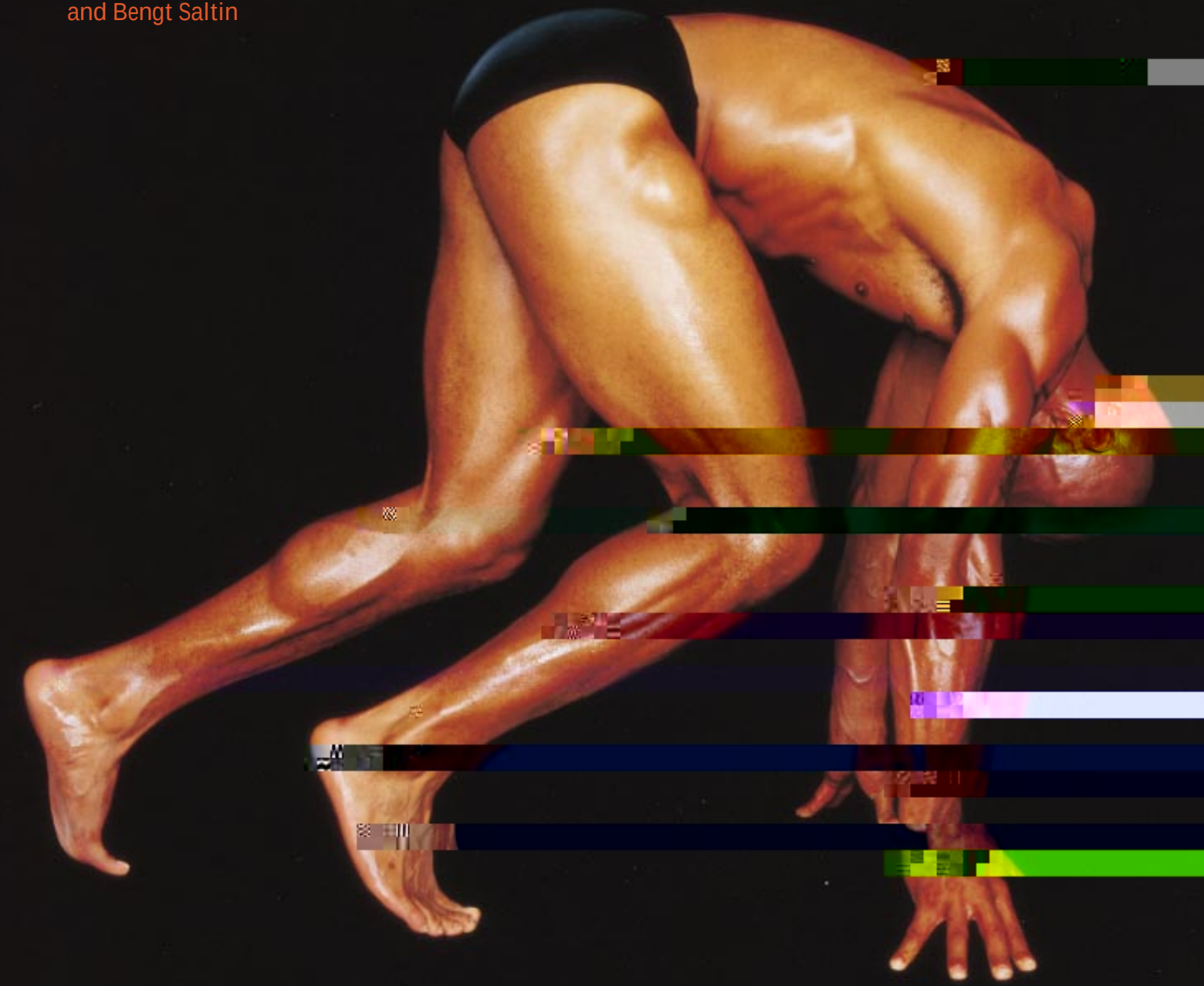

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On your marks!" A hush falls as 60,000 pairs of eyes are fixed

add it to the normal pool of genes.

This method is not very efficient yet, so researchers often use viruses to carry the gene payload into a cell's nuclei. A virus is essentially a collection of genes packed in a protein capsule that is able to bind to a cell and inject the genes. Scientists replace the virus's own genes with the artificial gene, which the virus will then efficiently deliver to cells in the body.

Unfortunately, and in contrast to the direct injection of DNA, the artificial gene payload will be delivered not only to the muscle fibers but also to many other cells, such as those of the blood and the liver. Undesirable side effects could very well occur when the artificial gene is expressed in cell types other than the targeted ones. For example, if a gene causing extended muscle hypertrophy were injected, this would lead to the desired growth of the skeletal muscles. But it would probably also lead to hypertrophy of another kind of muscle, namely that of the heart, giving rise to all the well-known complications of having an enlarged heart. So researchers have explored another approach, which entails

oratory and reintroducing the cells into the body.