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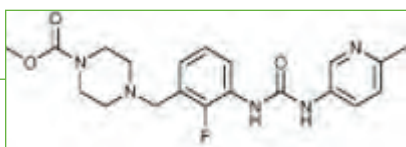
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## Drug Discovery: A Potential Treatment for Heart Failure Patients

Ashruta Patel

Myosins are important in helping the heart contract through their motor properties. Heart failure results from the proteins being unable to contract. A small molecule, Omecamtiv mecarbil is a direct activator of cardiac myosin and has been considered a potential treatment for heart failure patients. The American Heart Association predicts nearly 300,000 deaths occur every year in the United States from heart failure. Omecamtiv mecarbil is still being investigated further through clinical trials; however, the possibility of affected patients using it in both intravenous and oral formations can motivate other drug discovery programs.



[Figure 1 - Omecamtiv mecarbil structure]

Researchers at South San Francisco, California-based Cytokinetics have discovered that heart contractions rely on isoforms that have different ATP (adenosine triphosphate) hydrolysis rates. Cardiac myosin hydrolyzes ATP and the energy is used to facilitate large conformational changes in protein necessary for muscles fibers to contract. The fast and slow isoforms assist with contractions in a normally functioning heart. Contractile dysfunction could occur when the amount of these ATP-hydrolyzed myosin isoforms decrease, which eventually leads to heart failure.

This drug helps increase cardiac myosin's rate of ATP hydrolysis which in turn helps elevate cardiac function. Omecamtiv mecarbil binds to an amino acid sequence on the cardiac myosin. This drug is selective for slow skeletal muscle myosin and thus does not affect fine motor movements. Therefore, if Omecamtiv mecarbil were to be chosen as a successful drug for heart failure patients, the high rates of heart disease could be lowered and additional drug discoveries could lead to additional important innovations for various illnesses of concern.

### References

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