

Brookfield East High School SMART Team

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C-fos: Got Your Back!

PDB: 1FOS

Primary Citation 1: Glover, J. N. M. & Harrison. (1995). Crystal structure of the heterodimeric bZIP transcription factor c-Fos–c-Jun bound to DNA. *Nature* 373: 257-261.

Format: Alpha carbon backbone

RP: Zcorp with plaster

Description:

Climbing the stairs, speed-walking to class, jumping around the room — all are instinctually effortless. Spinal cord injuries change all of that. When a spinal column injury occurs, severed nerves prevent commands from being sent to parts of the body beyond the injury site, leaving a person with little hope of a full recovery. Our understanding of the mechanisms behind spinal injury rehabilitation is currently very limited.

The transcription factor c-fos is an indicator of active neurons, making it possible to assess functional recovery in

a rehabilitation program. The increased presence of c-fos within a group of cells' nuclei can be compared in different animal rehabilitation program groups to determine ideal cells for specific spinal cord injury rehabilitation methods. C-fos works with other transcription factors such as c-jun, binding to DNA specifically on the 5'-TGAGTCA-3' sequence. For this to occur, c-fos and c-jun dimerize. Studying c-fos can aid in developing more advanced forms of spinal rehabilitation that aim on rewiring neural connections. The Brookfield East SMART (Students Modeling a Research Topic) Team designed a model of c-fos using 3D printing technology. The c-fos model focuses on the coiled-coil at the carboxy-terminal region. Further research of c-fos improves our understanding of tissues with limited regenerative abilities and allows us to utilize c-fos as a tool to assess functional tissue regeneration otherwise thought to be limited.



Specific Model Information:

- C-FOS Helix: crimson
- C-JUN Helix: slate gray
- DNA: slategray
- DNA and C-FOS Binding site: dark cyan
- Hydrogen Bonds: white
- Important amino acids: Lime green
 - Asn147
 - Ala150
 - Ala151
 - Arg155
 - Thr162
 - Thr169
 - Leu172
 - Lys176
 - Leu179
 - Ile183
 - Leu186
 - Lys190
 - Leu193
 - Leu197
- Structural supports are Navajo white

<http://cbm.msoe.edu/smartTeams/index.php>

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