

For this IPRO we will be working on three different technologies, all of which help victims of cardiac arrest. These technologies include: a shaker, a cooler, and a breathing patch. Below please find that budget that is needed to produce a prototype for each of these technologies.

The shaker is to be used immediately after a victim has suffered cardiac arrest. The victim is placed onto a board that will generate a particular frequency for z-plane oscillations. These oscillations will provide periodic sinusoidal inertial forces (pGz) that will help to create blood flow within the victim. Below is the budget needed to create a prototype of the Shaker.

| Item | Price/Unit | Quantity | Total Cost | Need for Item | Store Name |
|----------------|------------|----------|------------|---|--|
| Electric Motor | \$250 | 1 | \$250 | Will be used to provide power to system. | www.omnimodels.com |
| Battery | \$100 | 1 | \$100 | Will provide energy to the motor. | www.mcmastercarr.com |
| Crack Arm | \$100 | 1 | \$100 | Will provide energy should the battery die. | www.mcmastercarr.com |
| Wood | \$60 | | \$60 | 1in. 24"x48" used as a foundation for the board | www.ebay.com |
| Carbon Fiber | \$80 | | \$80 | Used as support for the wooden board. | www.mcmastercarr.com |
| Wheels | \$20 | 2 | \$40 | Used to allow the moving of the board. | www.mcmastercarr.com |
| Tracks | \$10 | 2 | \$20 | Dresser like tracks that will be attached to a plate used to create frictionless motion. | www.mcmastercarr.com |
| Springs | \$4 | 4 | \$16 | Used on wheels to insure the correct frequency of motion, and to make the energy used more efficient. | www.sears.com |
| Rubber Pad | \$30 | | \$30 | Used to create traction between the track plate and the ground. | www.mcmaster.com |

Total Shaker Budget: \$696

The Cooler, is a devise that is to be used simultaneously with the shaker. Taking the body down to a hypothermic state within hours can save not only heart muscle but improve the severity of a brain injury. Within four minutes of a heart attack brain cells begin to die off. The purpose of the cooler is to lower the temperature of the body and brain, in order to decrease brain damage after resuscitation. Below is the budget needed to create a prototype of the Cooler.

| Item | Price/ Unit | Quantity | Total Cost | Need for Item | Store Name |
|---|-------------|----------|------------|---------------------------------|--|
| Thermally Conductive Material (36" Silicone Rubber) | \$200.00 | 1 | \$200.00 | Used to retain cool temperature | http://www.stockwell.com |
| Insulating Material (Rubber) | \$20.00 | 1 | \$20.00 | Decrease Temperature loss | www.rubbersheetroll.com |
| Dust-Off compressed gas duster | \$20.00 | 5 | \$100.00 | Cooling supply | www.target.com |

Total Cooler Budget: \$320

The Na₂S Patch will also be used at the same time as the shaker and cooler. The patch will cause the victim to enter into a comatose- like state so that when the victim is resuscitated there will be a decreased amount of oxygen entering the body. As the victim comes out of this comatose- like state the oxygen flow to the body will slowly increase. This will lower the amount of brain and tissue damaged caused. Brain and tissue damage typically develops from the sudden rush of oxygen entering into a revived person's body. By gradually increasing the intake of oxygen there is less shock to the body and less damage done. Below is the budget needed to create a prototype for the Na₂S Patch.

| Item | Price/Unit | Quantity | Total Cost | Need for Item | Store Name |
|---|------------|----------|------------|--|--|
| Sodium Sulfide Monohydrate | | | \$51.46 | Active chemical to be used in the patch. | www.fishersci.com |
| Ethanol | | 500ml | \$48.95 | Used to increased the amount of chemical absorbed into skin | www.fishersci.com |
| Gauze Sponges | | | \$7.14 | 2x2 12ply used as part of patch that contains sodium sulfide gel. | www.fishersci.com |
| Coban Self Adherent Wrap | | | \$39.63 | Used to make patch applicable. | www.fishersci.com |
| Pain Relieving Patch | | | \$14.00 | Used to make patch applicable | www.fishersci.com |
| Carbomer | | | \$85.56 | This a chemical which serves gelling actions. | www.fishersci.com |
| Razor Blades | | | \$13.40 | Needed to cut sodium sulfide gel and gauze aseptically. | www.fishersci.com |
| Tissue Path Disposable Base Molds | \$106.27 | 1 | \$106.27 | Used to make gel molds. | www.fishersci.com |
| Nitrile Protective Gloves | \$0.26 | 100 | \$25.60 | Used as a safety measure to protect the skin from chemicals. | www.fishersci.com |
| Fog-Free Surgical or Procedure Mask with Splashguard Visor and Eye Shield | \$2.17 | 100 | \$217.01 | Used as a safety measure to protect the face and eyes from chemicals which can cause skins burns and produces a hazardous gas. | www.fishersci.com |

Total Na₂S Patch Budget: \$609.02

Total Overall Budget: \$1,625.02