

# THE BIO-PUMP STORY



Images provided courtesy of the Bio-Pump's co-inventor, Edson Rafferty.

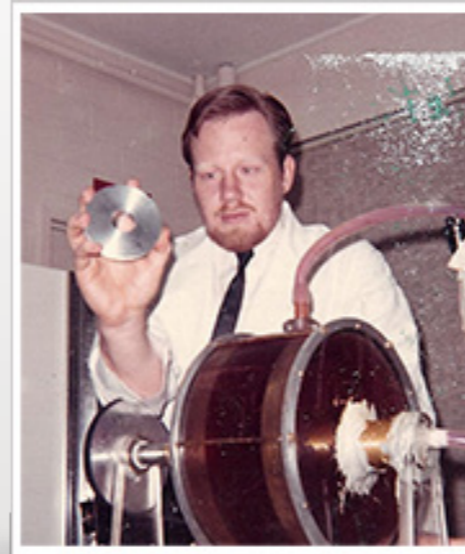
## 1964

### A **MEETING** OF MINDS

Visionary co-inventors of Bio-Pump meet at Syracuse University. They bond over their common interest in developing an artificial heart.



**DR. HAROLD KLETSCHKA**  
CARDIAC SURGEON



**EDSON RAFFERTY**  
CHEMIST/MECHANICAL ENGINEER

Images provided courtesy of the Bio-Pump's co-inventor, Edson Rafferty.

## 1967

### A **NEW DESIGN** GETS A SPIN

Edson Rafferty, inspired by a record player turntable, develops a prototype for a centrifugal pump design that would later evolve into the Bio-Pump. This first version was designed with and without impellers.



# 1970

## FORMING A STARTUP

Bio-Medicus is founded by Kletschka, Rafferty and chemist Doug Olson. Their multidisciplinary approach to product development, testing and marketing would ultimately deliver the Bio-Pump to the world.



**BIO MEDICUS®**

Image provided courtesy of the Bio-Pump's co-inventor, Edson Rafferty.

# 1972

## SUCCESSFUL IPO

Initial public stock sale raises \$1.6 million, securing definitive funding for the Bio-Pump.



Image provided courtesy of the Bio-Pump's co-inventor, Edson Rafferty.

# 1975

## A **DARING** TEST

**July 16, 8:01-8:06 a.m.** It was during these historic 5 minutes that the Bio-Pump was brought to life. The first human trial on Barbara Kletschka, the sister to Dr. Kletschka proved to be a successful milestone.



Image provided courtesy of the Kletschka Family.

# 1975

## THE REAL JOURNEY

In August of that year the first clinical use, at Texas Heart Institute, solidified the future of the Bio-Pump, giving birth to a large segment of modern healthcare. The next few years saw increased growth and interest in the centrifugal pump.



Image provided courtesy of the Bio-Pump's co-inventor, Edson Rafferty.

# 1980

## THE **NEXT** PHASE

A new decade saw the launch of the Bio-Console Model 520. It featured Pulsatile and Auto Flow options. 645 units were manufactured.



*Bio-Console  
Model 520*

# 1985

## THE FAMILY **EXPANDS**

New innovation adds members to the Bio-Pump family—  
Bio-Pump BP-50 (Pediatric) and Bio-Pump BP-80 (Adult).



*Bio-Pump BP-50  
(Pediatric)*



*Bio-Pump BP-80  
(Adult)*

# 1986

## DISPLAYS GO **DIGITAL**

The new Bio-Console Model 540 featured digital displays, as well as an internal battery. 3624 units were manufactured.



*Bio-Console  
Model 540*

# Medtronic

1990

## A **NEW** ERA

Medtronic acquired Bio-Medicus in September that year, fortifying its legacy of innovation.



# 1993

## ENHANCED FLOW

The launch of the Bio-Console Model 550 brought an enhanced flow system, digital/analog output for data acquisition, and elimination of the need for GAIN adjustment. 2815 units were manufactured



*Bio-Console  
Model 550*

**Medtronic**

1993

A **MAJOR** MILESTONE

**1,000,000  
PATIENTS**

By this year, a staggering 1,000,000 patients had received care from the Bio-Pump and Bio-Console, proving the longevity and reliability of the patented centrifugal design.

# 1994

## DROP-IN DESIGN

Bio-Console Model 550M  
featured a Sarns 9000 drop-in  
design and tethered display.  
168 units were manufactured



*Bio-Console  
Model 550M*

# 2000

## SMOOTH VORTEX

The Bio-Pump Plus' nonocclusive design promotes laminar flow; improving blood- and air-handling capabilities and decreasing blood trauma<sup>1</sup>.



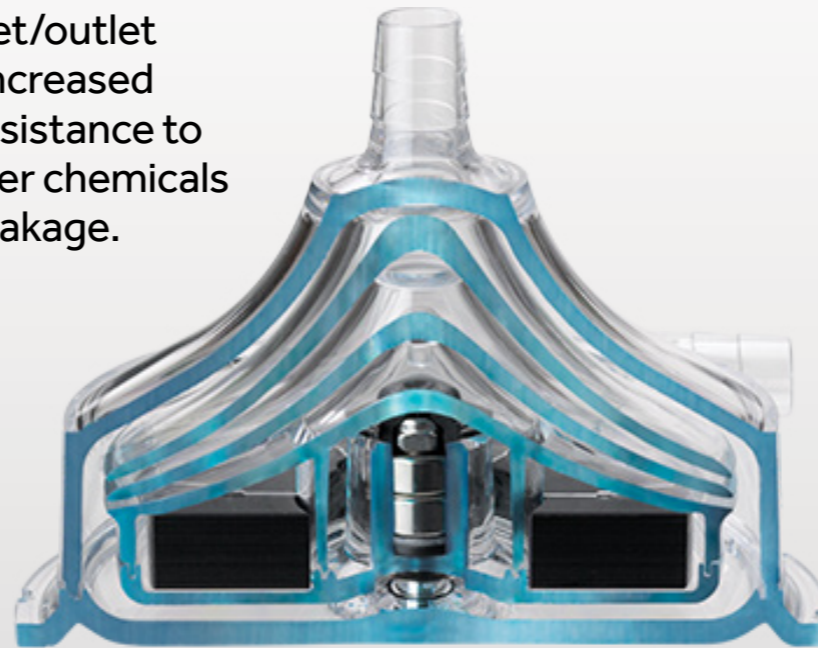
*Bio-Pump  
Plus BPX-80*

1. Meta-analysis data on file at Medtronic Perfusion Systems  
Federal law (USA) restricts this device to sale by or on the order of a physician.

## 2003

### **PROVEN** RELIABILITY

Polycarbonate outer housing and inlet/outlet ports provide increased strength and resistance to alcohol and other chemicals to minimize breakage.



*Bio-Pump Plus BPX-80 with polycarbonate housing*

Federal law (USA) restricts this device to sale by or on the order of a physician.

## 2005

### MICROPROCESSOR- **CONTROLLED** PUMP

The Bio-Console Model 560 introduced the industry's first microprocessor-controlled pump, along with an innovative touchscreen and safety system. 2204 units were manufactured.



*Bio-Console  
Model 560*

# 2011

A **LOW PRIME** OPTION



*Affinity™ CP  
Centrifugal  
Blood Pump  
AP40*

The Affinity™ CP Centrifugal Blood Pump AP40 global launch, introduced to the world a sleek, low profile and low prime design for even greater blood handling.

Federal law (USA) restricts this device to sale by or on the order of a physician.

# 2016

## CELEBRATING 40 YEARS

To this day, the legacy of the centrifugal pump design that **Dr. Kletschka** and **Edson Rafferty** created lives on and continues to be an integral component of modern healthcare.



A poster displayed at AACP, CREF, AmSECT, and Sanibel Symposium invited perfusionists to sign their names in recognition of when they first used the Bio-Pump and to share their experience working with it.

# Medtronic

**Affinity™ CP Pump Indications:** The Affinity CP Centrifugal Blood Pump is used to pump blood through the extracorporeal bypass circuit for extracorporeal circulatory support for periods appropriate to cardiopulmonary bypass (up to 6 hours). It is also indicated for use in extracorporeal support systems (for periods up to 6 hours) not requiring complete cardiopulmonary bypass (e.g. valvuloplasty, circulatory support during mitral valve reoperation, surgery of the vena cava or aorta, liver transplants). The Affinity CP Centrifugal Blood Pump is driven by the External Drive Motor or the Emergency Handcrank. The Affinity CP Centrifugal Blood Pump is intended for use with Medtronic controllers or may be used with the Stöckert™ and Sorin™ centrifugal pump systems or the Sarns™ and Terumo™ centrifugal systems by attaching the Affinity CP adapter.

**Affinity™ CP Pump Contraindications:** The Affinity™ CP Centrifugal Blood Pump is contraindicated for use as a cardiotomy suction device. This device, used for any other purposes than the intended use, is the responsibility of the user.

**Bio-Pump Plus Indications:** The Medtronic Bio-Pump Plus centrifugal blood pump is indicated for use only with the Medtronic Bio-Console pump speed controller to pump blood through the extracorporeal bypass circuit for extracorporeal circulatory support for periods appropriate to cardiopulmonary bypass (up to six hours). It is also indicated for use in extracorporeal support systems (for periods up to six hours) not requiring complete cardiopulmonary bypass (eg. valvuloplasty, circulatory support during mitral valve reoperation, surgery of the vena cava or aorta, liver transplants).

**Bio-Pump Plus Contraindications:** The Medtronic blood pumping system is contraindicated as a cardiotomy suction device. This device used for any other purposes than the intended use is the responsibility of the user.

**Caution:** Federal law (USA) restricts this device to sale by or on the order of a physician.

# Medtronic

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