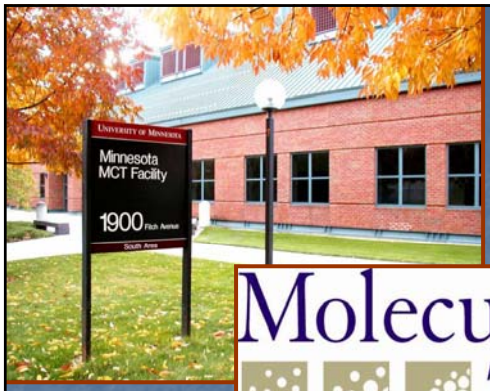


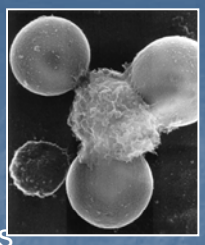
Molecular&Cellular Therapeutics

UNIVERSITY OF MINNESOTA

Our Mission

To promote the advancement of science of biotherapeutics through Good Manufacturing Practices

What We Do



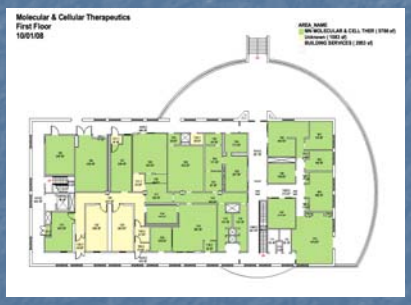
- Translate basic discovery to clinical trials, across a wide array or therapeutic classes
- Develop and manufacture therapeutic products meeting Good Manufacturing Practices (cGMPs) and current Good Tissue Practices (cGTPs)
- Support Phase I/II/III clinical trials of molecular and advanced cell-, tissue-, gene-based, protein, drug therapies for researchers and external contracts

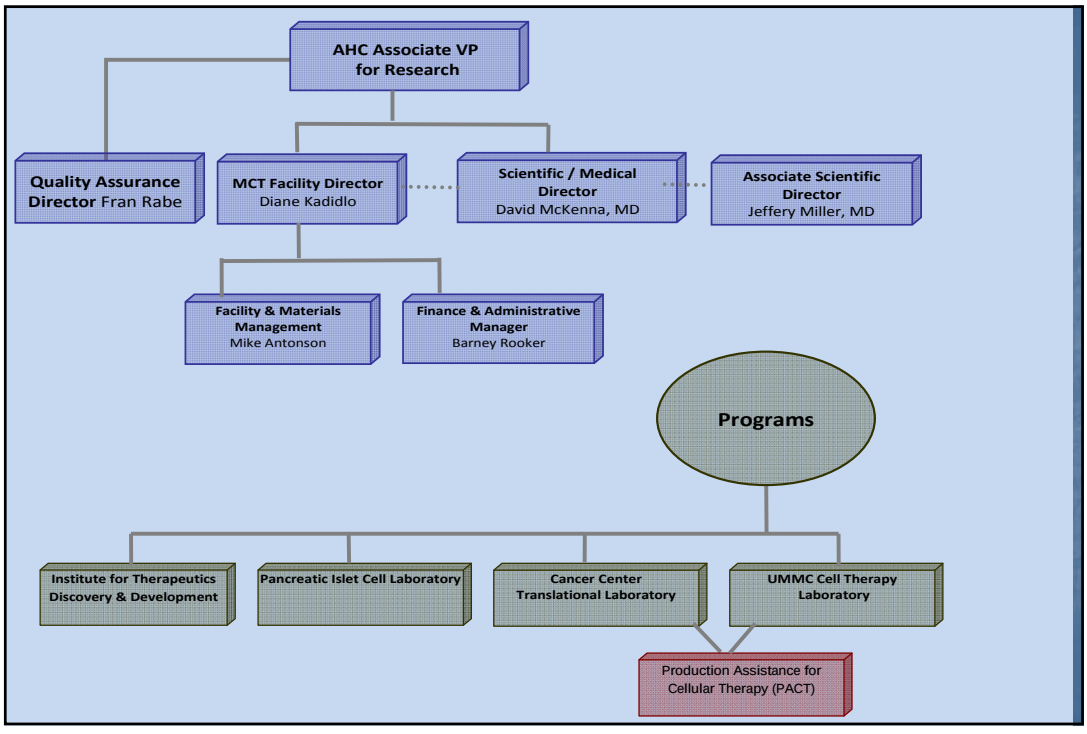
Our Values

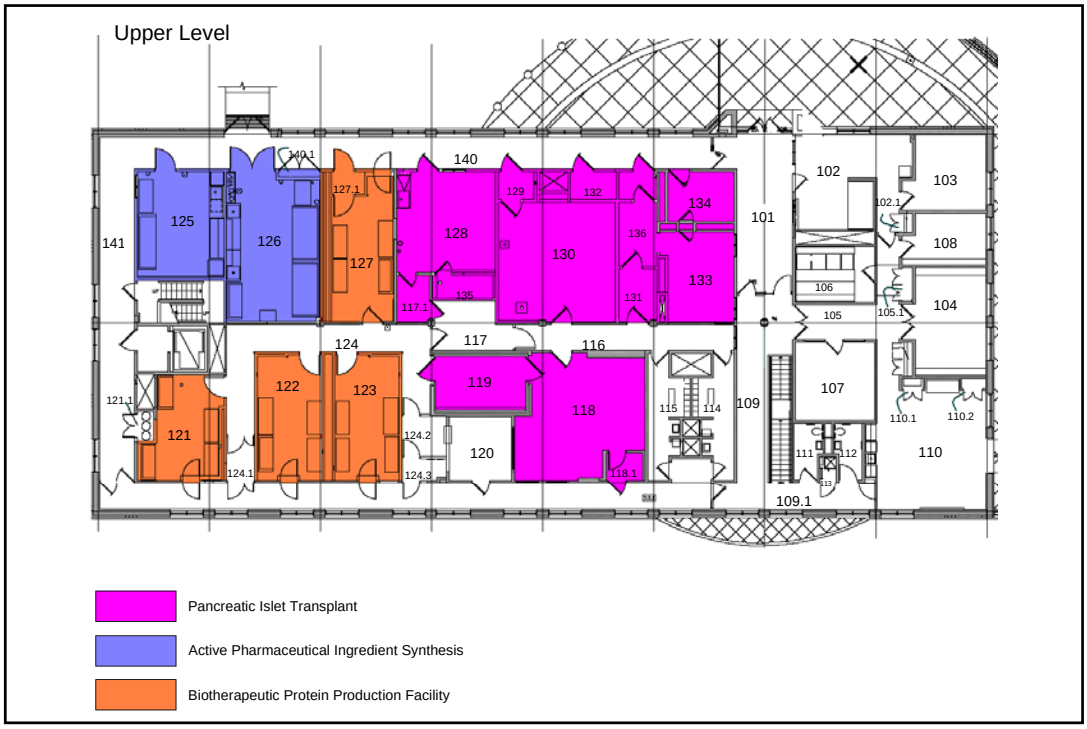
- Focus on what matters
  - Affect on safety, efficacy, quality
- Act responsibly
- GMP/GTP philosophy
  - Adopt and adapt
- Good sense
  - Scientific and business

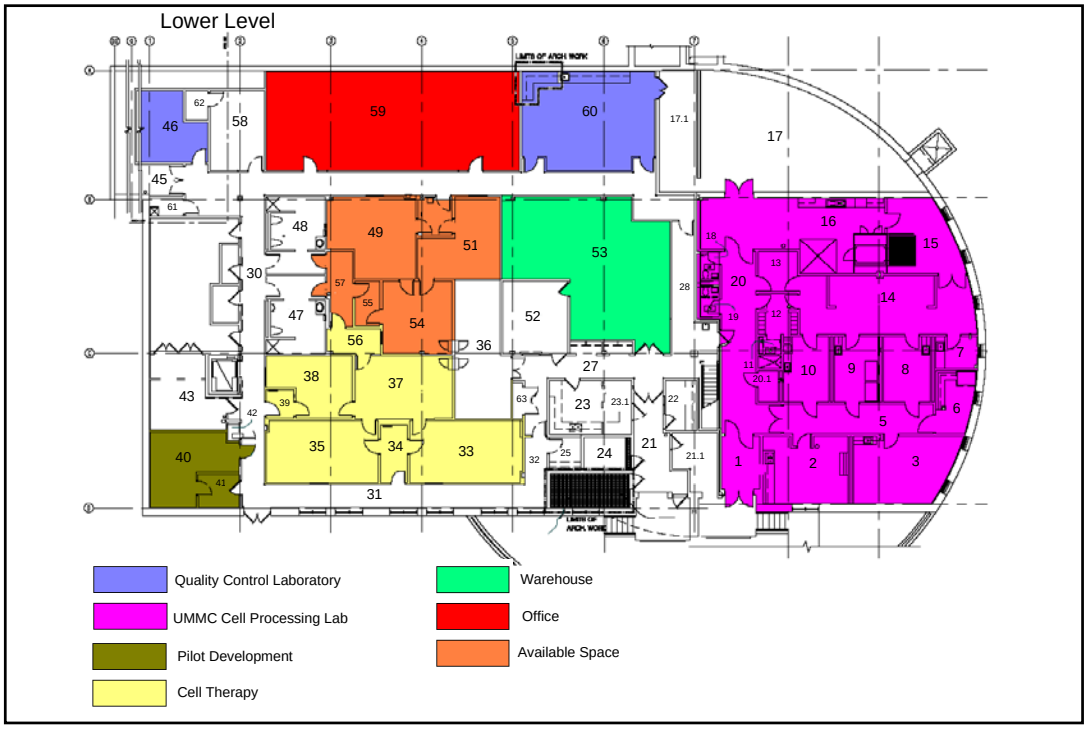
Molecular and Cellular Therapeutics

- Facility – 36,000 square feet
- 20 ISO Class 7 & 8 Production Clean Rooms
- 19 Investigational New Drugs (IND)
- Over 900 products produced annually
- Manufacturing Units – Cell Therapy, Protein Production Pancreatic Islet Transplant, and Pharmaceutical Synthesis






Upper Level
140.1
140
127.1
129
132
134
102
103
102.1
125
126
127
128
130
136
101
141
108
106
105
105.1
104
135
117.1
131
133
124
117
116
119
118
107
121.1
122
123
115
114
109
110.1
110.2
121
124.2
120
111
112
110
124.1
124.3
118.1
113
109.1
Pancreatic Islet Transplant
Active Pharmaceutical Ingredient Synthesis
Biotherapeutic Protein Production Facility

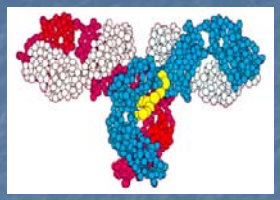

Lower Level
LIMITS OF ARCH WORK
62
46
58
59
60
17.1
17
45
61
48
49
51
53
18
16
15
13
20
30
57
55
28
14
12
19
47
54
52
56
36
27
11
20.1
10
9
8
7
38
37
63
23
23.1
22
43
39
42
6
5
40
35
34
33
32
25
24
21
21.1
1
2
3
41
31
Quality Control Laboratory
UMMC Cell Processing Lab
Pilot Development
Cell Therapy
Warehouse
Office
Available Space

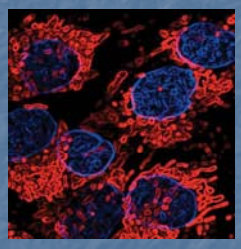
Products

- Hematopoietic Transplant
  - Bone Marrow, Peripheral Blood, Cord Blood
- Pancreatic Islet Transplant
- Immunoadoptive Therapies
  - Natural Killer Cells
  - T Regulatory Cells
  - Mesenchymal Stem Cell
  - Tumor Vaccine
- Cardiac Repair
  - Bone Marrow Mononuclear
  - Cardiac Derived Cells
- Monoclonal Antibodies/Proteins
- Active Pharmaceutical Ingredients (API)

Technologies

- Cell Preservation and Storage
- Positive and Negative Cell Selection
- Cell Expansion and Activation
- Drug Synthesis
- Vaccine Production
- Master Cell Bank Production
- Protein Production and Purification

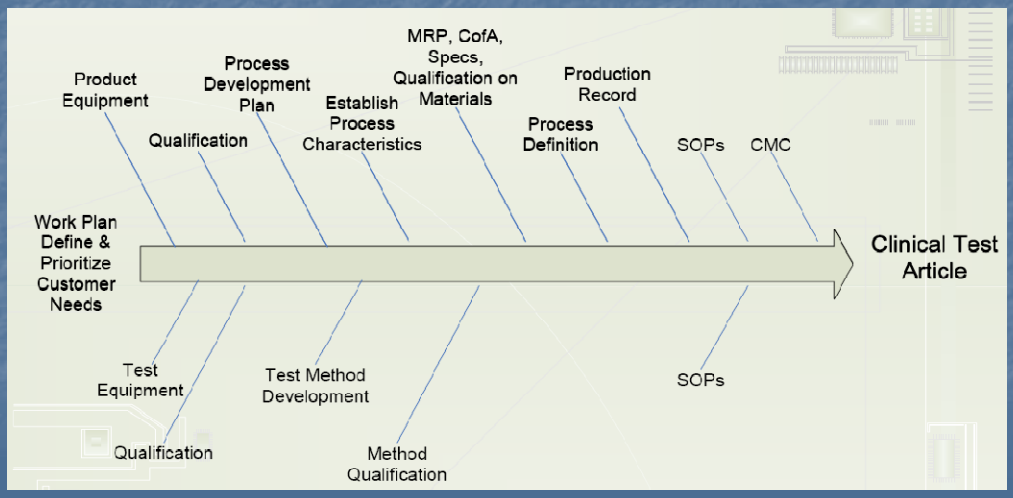




Core Activities

- Quality and Compliance
- Operations/Quality/Materials Management
- Control of Critical Systems
- Program Budgets/Forecasts/Cost Accounting
- Project Management
- Equipment Management
- Document Change Control
- Process Development/Qualification/Validation

Process Development

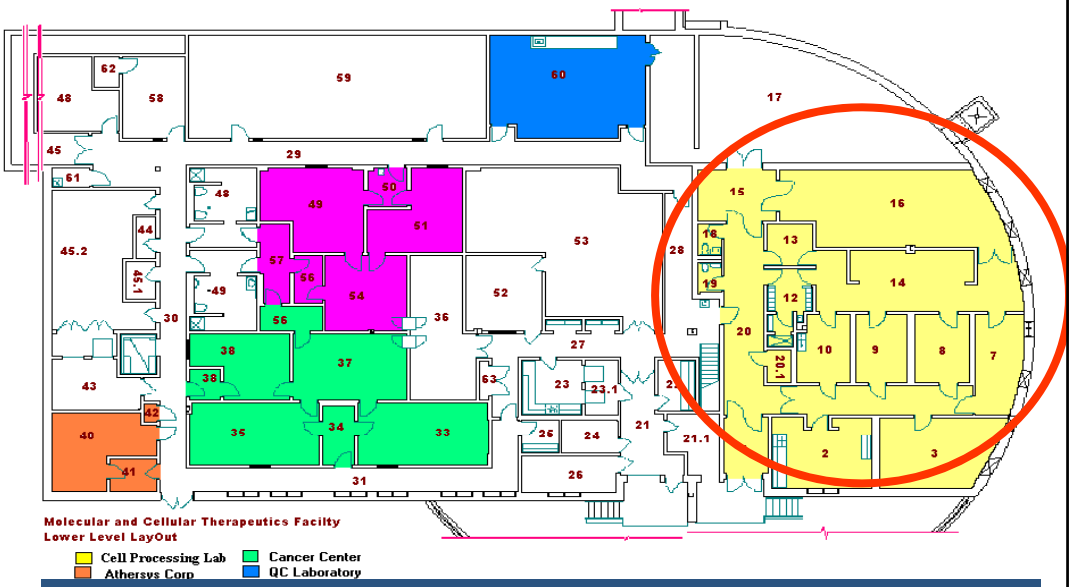


Quality Assurance

- All 4 Programs (Cell, Islet, Mono aby, API) comply with one Quality Program
  - Common Quality Plan
  - Type V Drug Master File
- Centralized QA Systems
  - Document Control System
  - Equipment Management
  - Record Keeping
  - Lot Release
  - Audits
- Staffing
  - Quality Director
  - 2 QA Staff

Facilities and Services

- Security
  - Limited Access – Electronic Card Key
- Facility Design
  - Controlled Environment Areas (ISO Class 5 and 7)
  - Single pass, isolated differential air pressure rooms, negative pressure capabilities
- Central Alarm Monitoring
  - Equipment
  - Critical Systems – Heating, Ventilation & Air Conditioning
- Materials and Inventory Management
- Equipment
  - Calibration & Preventative maintenance
  - IQ/OQ/PQ



LOWER LEVEL
7,000 Sq ft Clean Space

University of Minnesota Medical Center, Fairview Clinical Cell Therapy Laboratory

- Established 1979 in support of the Blood and Marrow Transplant Program at the University of Minnesota. Moved to MCT Facility 1996
- Processes more than 700 human bone marrow, peripheral blood, umbilical cord blood and tissues annually
- Provide translational development expertise for bringing novel cell engineering techniques from research to clinical applications

UMMC Cell Therapy Laboratory
Clinical Operations - GTP Production

- 3300 sq ft, separate air handling system
- Unclassified space meets the requirements for Class 100,000
- Clinical production not requiring extensive manipulation.
- Processes: cryopreservation, positive and negative selection.
  - Auto/Allo PB, CB & Bone Marrow
- Closed system processes – products in bags; biological safety cabinets

GMP Production Areas

- Class 10,000 (ISO 7) Clean Suite
- ISO 5 Biological Safety Cabinets
- Single pass, isolated differential air pressure rooms, negative pressure capabilities
- Terminal HEPA Filtration, 20-70 Air Changes/Hr
- Clean Room surfaces, epoxy liquid flooring coved base, reinforced resinous wall surfacing, and epoxy painted veneer plaster ceilings

Fulfillment of Regulatory Requirements...