Nature vs Nurture: The Critical Role of the Environment in Orthopaedic Research

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Why Teams and Environment are So Important in Orthopaedics?

• Most of the problems we now work on in orthopaedics are too complex for one person or group to solve
  – Bioengineers
  – Scientists
  – Surgeons
  – Clinical researchers (epidemiologists, CRCs)
  – Etc.

• Increasing emphasis on translation of basic science to the clinic

• The disappearing surgeon-scientist necessitates partnerships between clinicians and researchers
Engineering a New Body

Life Magazine, 1989
Engineering Implants and Devices

Time Magazine, 1999
Engineering Cells and Tissues

Post-genomic era, 2018
Engineering the Genome
What about our intrinsic “Nature”?  

Common Qualities of Successful Scientists

- Analytical, critical thinker (i.e., smart)
- Hard-working
- Persistent
- Good communicator
- Curious
- Risk-taker
- Creative

In research training, you have already been selected for most of these qualities (whether you realize it or not)
If Not “Nature”...

The **Environment** is critical for the development of a successful research program

- Institutional commitment and aligned vision
- Department leadership - Research as a priority
- Colleagues and faculty
- Access to Trainees
- Space and resources
- Administrative support
- Scientific environment (Core facilities, Centers)
What Makes a Good Research Environment?

- The science is novel and solid
- The head of lab/research is successful, or promises to be
- There is sufficient funding to do the research
  - Internal vs external
- The people in the lab are happy and productive
- The research group has a recognizable personality and an identifiable culture
- Recruiting and retaining the best people
- As the research director, you create the environment
- As department chair, you are responsible for selecting and supporting the research director
Being a Research Leader: What Skills Did you Learn in School?

- Ability to generate, prioritize and analyze data
- Organization and communication skills
- Ability to work productively with difficult people
- Ability to work in a high stress environment
- Persistence
- Knowing the rules (and finding the boundaries)
- The ability and courage to start something without knowing how

Failure is not an Option

"FAILURE IS AN OPTION HERE. IF THINGS ARE NOT FAILING, YOU ARE NOT INNOVATING ENOUGH."

- Elon Musk

You miss 100% of the shots you don’t take
- Wayne Gretzky
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What are the Elements of a Good Team?

- By far #1 is the recruitment and retention of the right people
- Put significant effort into the interview/recruitment process
- Do they fit the team in expertise as well as the group’s culture?
- If they are meeting their own goals, they will stay with you
Recruit the Right People: Success Highly Depends on who you Hire

- Know what you want - but be flexible
- Seek extensive advice from people already in the group
- Bad hires are much worse than no one
- Bad people are bad, even if they are free
- Hiring the “convenient” applicant usually backfires
Once you have the people... How do you manage them?

- Clear expectations and consequences
- Context (how do they fit in the group?)
- Communication
- Culture
- Collaboration

- Creativity
- Control
Being a Mentor to the Team

- Everyone is different
- Mentoring the talented is easy
- Mentor each to his or her ability
- Some people do not want to be mentored
- Help the unhappy out
- Encourage other mentors
- Show that building their careers is as important as yours
Importance of Being Critical

• It’s the best thing you can do, sometimes…
• It is also one of the toughest - it can be extremely intimate.
• Follow through - don’t dump and run. Be constructively critical.
• Quick feedback is the most effective, positive or negative
• Follow up-
Evaluating team member’s performances towards goals

- Do at regular intervals: 6 months, 1 year
- All members of the team
- Goals:
  - Determine accomplishments
  - Set goals and benchmarks
  - Examine the members relationships with you and with others in the group
  - Document
  - Be honest
  - Be constructive
If they don’t know where they’re going, they won’t get there...

- Mission statement
- Think 5 years ahead individually
- 5 year plan
  Career
  Projects and lab
- Think 5-10 years ahead institutionally
Nurturing a Team Culture: You set the Tone

- The work comes first
- Make it fun
- Build trust with predictability
- Establish a work ethic
- Transparent communication and clear expectations
- Make it a home away from home (because it is for many people)
Make Communication an Essential Part of the Culture

• What to communicate: Your vision, latest results, funding decisions, travel experiences, successes, failures
• How to communicate: Conversation, emails, meetings (new online tools – Slack)
• When to communicate: As often as possible
• Communication line has to be in both directions
Encourage Collaboration within the Team

- Put new people to work with more experienced ones
- Encourage and incentivize internal collaboration
- Facilitate collaborations outside the group
- Create win-win situations
- Why don’t teams collaborate? Usually mistrust or lack of communication
Maintaining Morale

• Make the group feel part of and successful in the bigger world of science
• Appreciation of team members
• Help each person feel part of the team: don’t let anyone be marginalized
• Be vigilant about inside and outside influences – protect your team
• Don’t let your personal goals overshadow those of the team
• Encourage social interactions – having fun together outside the lab goes a long way
Traditions: a Chance to Cement the Lab Together…

Celebrate scientific victories:
- Papers accepted
- Grant awarded
- Thesis prelim or defense
- New jobs

Celebrate birthdays, holidays

Retreats

Happy hours, tutoring, fundraising, volunteer work
Evolve with the Team

- Small group, big group?
- More competent personnel
- Influx and outflux of personnel
- Failure and success
- Satisfaction and fulfillment
- Your own goals will change
What if your Institution Doesn’t Have the Right Environment?

• Try to change institutional culture or department leadership (often very difficult)
• Relocate somewhere with a better environment.
• Create microenvironment that works (can be difficult to sustain long-term).
• Seek an outside community (Professional Societies)
The ORS is a unique community of scientists, engineers, clinicians, surgeons, (and everything in between) all with an interest in musculoskeletal research.

**Mission:** To advance musculoskeletal research worldwide

**Vision:** A world without musculoskeletal limitations
There are over 650 section members total to date.
Four Simple Lessons for Building a Research Program

• Develop a vision and strategy for research
  – Must fit into the framework of your institution
Four Simple Lessons for Building a Research Program

• Surround yourself with good people.
  
  – The environment is the most important thing (that you can control) affecting your success
Four Simple Lessons for Building a Research Program

• Pursue the uncertain. Certainty may or may not ever come in science, but discovery and innovation will.
• (And you won’t be bored).

– “Without risk, there can be no progress”
   George Low, President of RPI
   Director, NASA Mercury & Gemini Programs
Four Simple Lessons for Building a Research Program

• Do the right thing.
  Spike Lee, Director & Artist

• Core Values
  • Scientific excellence and integrity
  • Innovation
  • Collaboration
  • Partnership
  • Advocacy
  • Diversity