Comprehensive Program Review

Life Sciences

Heather Faust, Division Chair

Spring 2023

MONTEREY PENINSULA College

Life Sciences STEM and CTE Departments

Biology, Health, Anatomy & Physiology
Medical Assisting, Dental Assisting,
Nutrition & Horticulture

Spring 2023

Presentation Outline

1. Introduce our team
2. Outline our degrees and certificates
3. Student demographics, who are our students?
4. Student interest and success, do we have enough students?
5. SCORE analysis to confirm program quality, viability, & commitment to student success

Mission Statement

Monterey Peninsula College is actively committed to student access and success and to fostering an equitable, inclusive, respectful, and supportive community by providing excellent academic programs and student services that respond to the needs of our richly diverse region. The College welcomes all students seeking to enrich their lives, advance their careers, complete certificates, earn associate degrees, and transfer to continue their educatio

Life Sciences Staff and Administration

- Deans: Vincent van Joolen (STEM) & Judy Cutting (CTE)
- Associate Deans: Herbert Cortez (STEM) & John Skellenger (CTE)
- Division Office Manager (DOM): Rosa Arroyo
- Science Lab Managers: Andrea Valdez-Schulz & J-P Solves
- Health Sciences CTE Lab Manager **(NEW!)**: Babak Ghavamian
- Custodial Support: Andy Ramirez
- Counseling Liaison: Elizabeth Gonzalez
- Division Chair: Heather Faust

Department Chairs, FT & *Adjunct* Faculty

- **Anatomy & Physiology:** Heather Faust (A) & Abeje Ambaw (P), Heather Craig (50%), Daniel Sanculi **(new position)**, *Osman Ahmed, Don Bard, Megan Noel & Reeyesh Patel*
- **Biology:** Heather Craig (50%), Kevin Raskoff, Princess Gilbert **(new, retirement replacement)** & *Randy Kochevar*
- **Dental Assisting:** Kari Grasmuck, *Maia Carpenetti, Pam Farley, Melissa Topper & Leana Miller*
- **Health:** Kevin Raskoff, *Kimberly Shirley, Megan Noel, Aletha Parker & Leilani Roth (PSTC collaboration)*
- **Horticulture:** *John Kern, Juli Hofmann, Peter Quintanilla, Greg Simmons & Alan Wheat (100% adjunct team)*
- **Medical Assisting**: Monika Bell, Gordon Gensel **(new position)**, *Jonathan Sandoval & Susie Carlson*
- **Nutrition**: Vanessa Lord **(new position)** *& Cynthia Poole*

Life Sciences Programs of Study (STEM/Allied Health)

Program	Associate in Science for Transfer	Associate in Science	Certificate of Achievement
Biology/Biological Sciences *New!	AS-T	AS *New!	
Environmental Science *New!	AS-T *New!		
General Studies: Natural Science Emphasis		AS	
Pre-Nursing		AS	
Pre-Dental Hygiene		AS	
Pre-Occupational Therapy		AS	
Pre-Physical Therapy		AS	
Health Service Professions *New!			COA *New!

Life Sciences Programs of Study (CTE/Allied Health)

Program	Associate in Science for Transfer	Associate in Science	Certificate of Achievement	Certificate of Training
Community Health Worker *New!			CA *New!	
Medical Assisting		AS	CA	
Medical Insurance & Coding Specialist		AS	CA	
Medical Office Administration		AS	CA	
Personal Wellness and Health Professions *New!				COT *New!
Dental Assisting		AS	CA	
Dietary Manager *New!			CA *New!	
Nutrition and Dietetics *New!	AS-T *New!			
Nutrition and Food *New!			CA *New!	

Life Sciences Programs of Study (CTE/Horticulture)

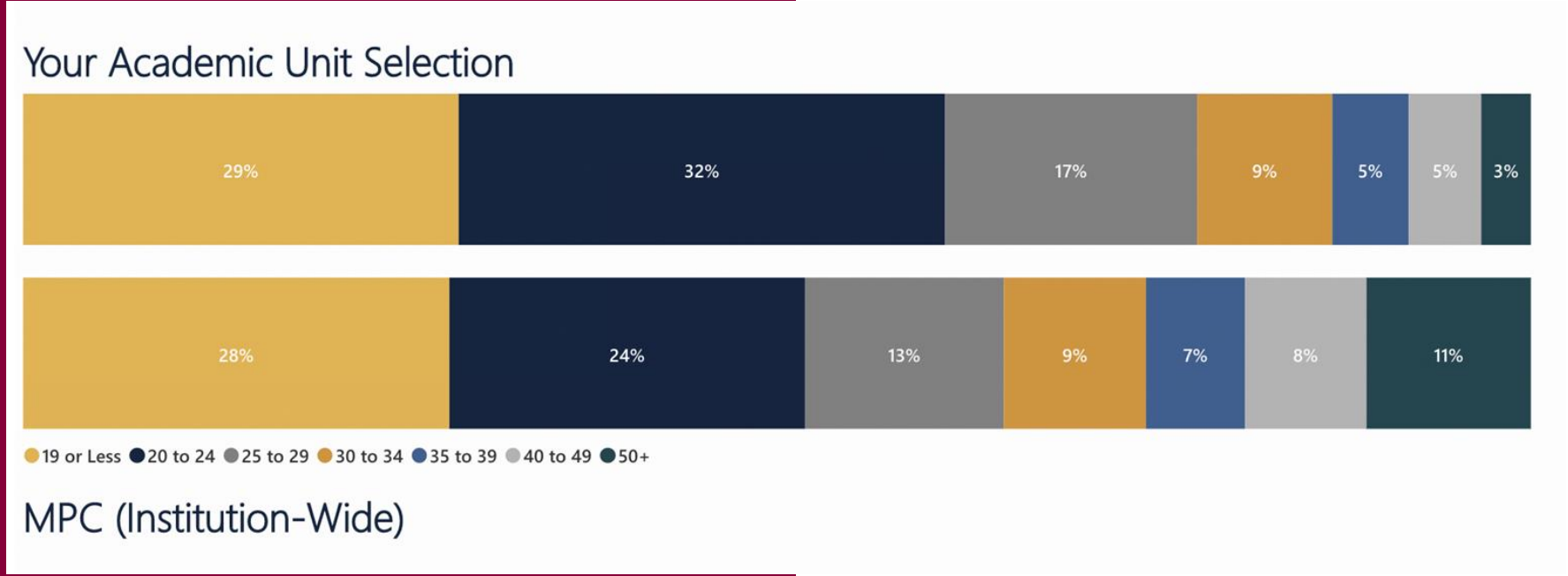
Program	Associate in Science for Transfer	Associate in Science	Certificate of Achievement	Certificate of Training
Ecological Horticulture *New!			**CA *New!**	
Horticulture		**AS**	**CA**	
Landscape Irrigation *New!			**CA *New!**	
Landscape Pest Management *New!			**CA *New!**	
Tree Care Specialist *New!			**CA *New!**	
Qualified Water Efficient Landscaper (QWEL) *New! *Spanish language options for text and exam!*				Industry recognized certification

Student Demographics

Life Sciences

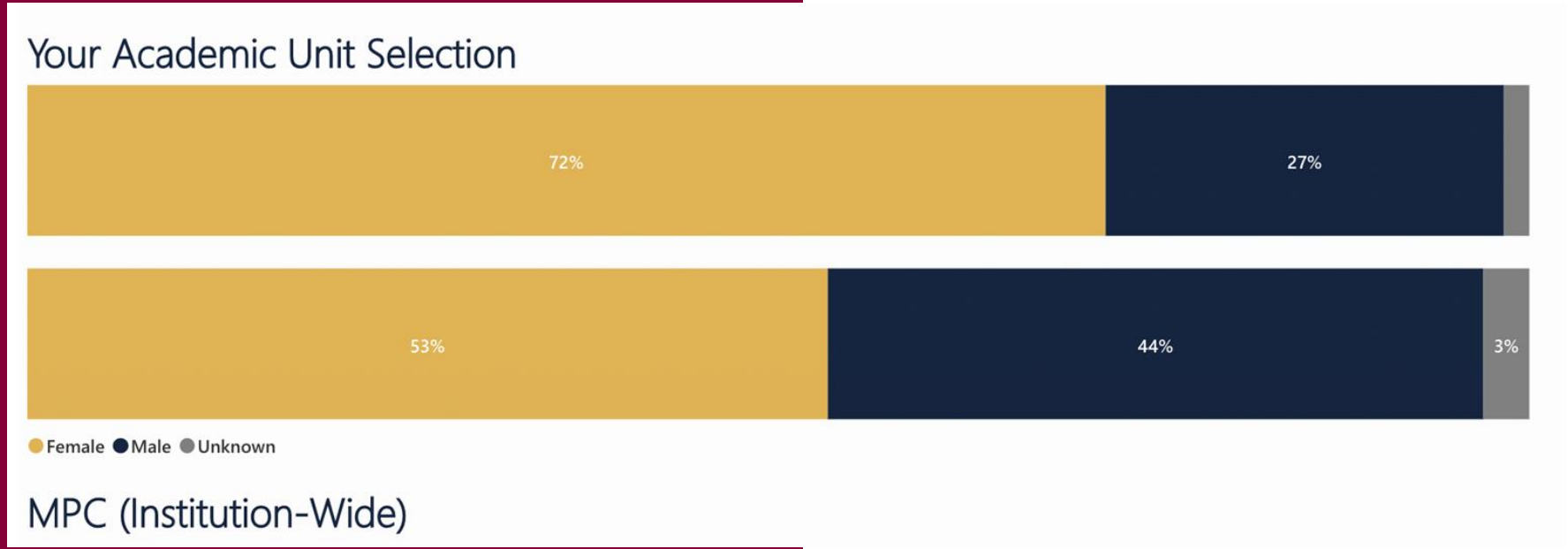
Age

61% under age 24



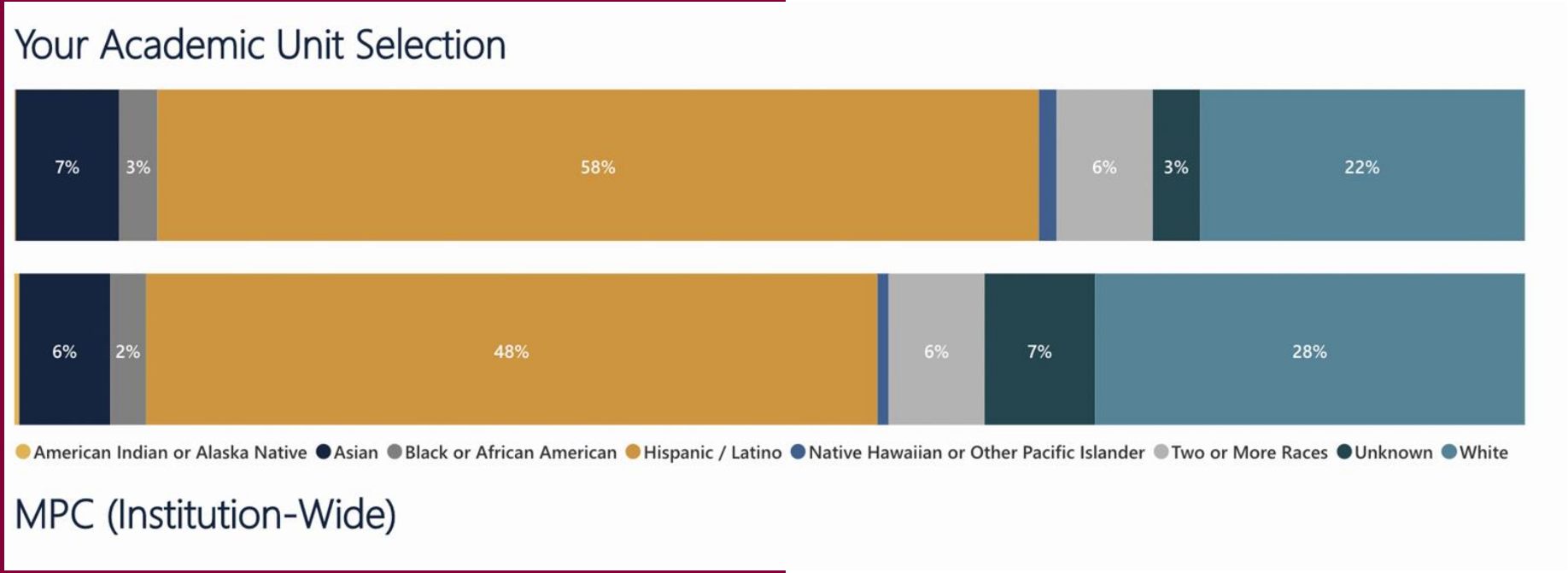
Gender

72% Female



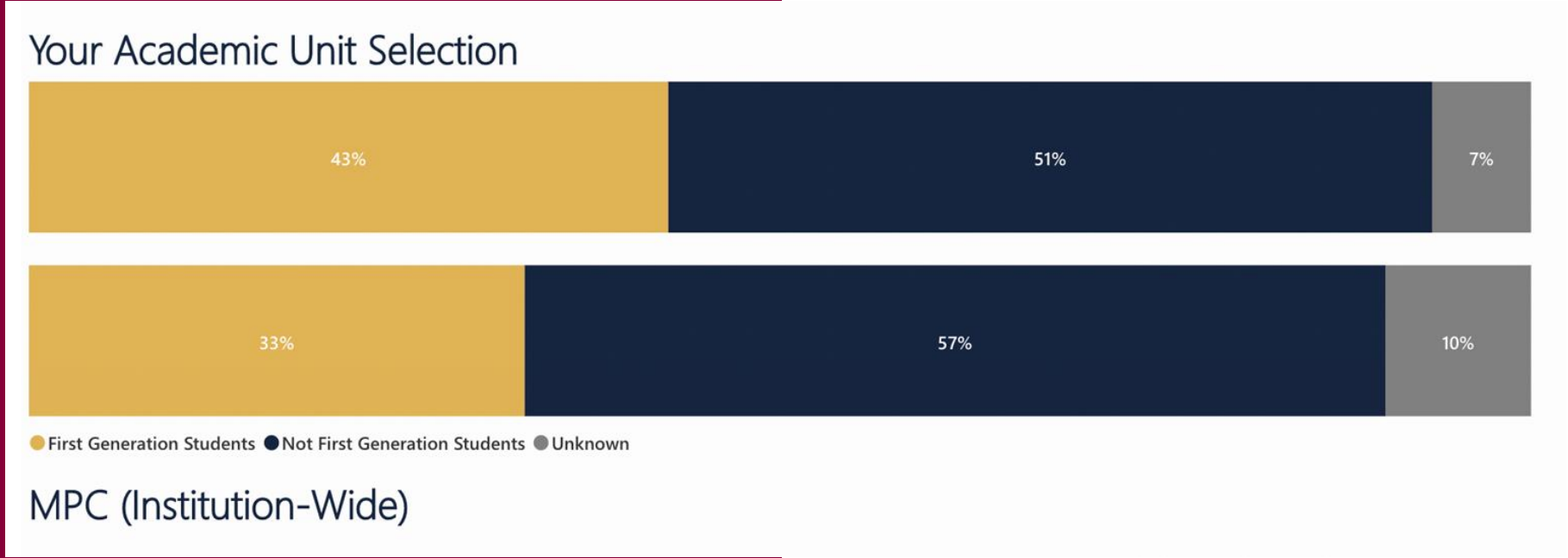
Race/Ethnicity

58% Hispanic/Latino



First Generation

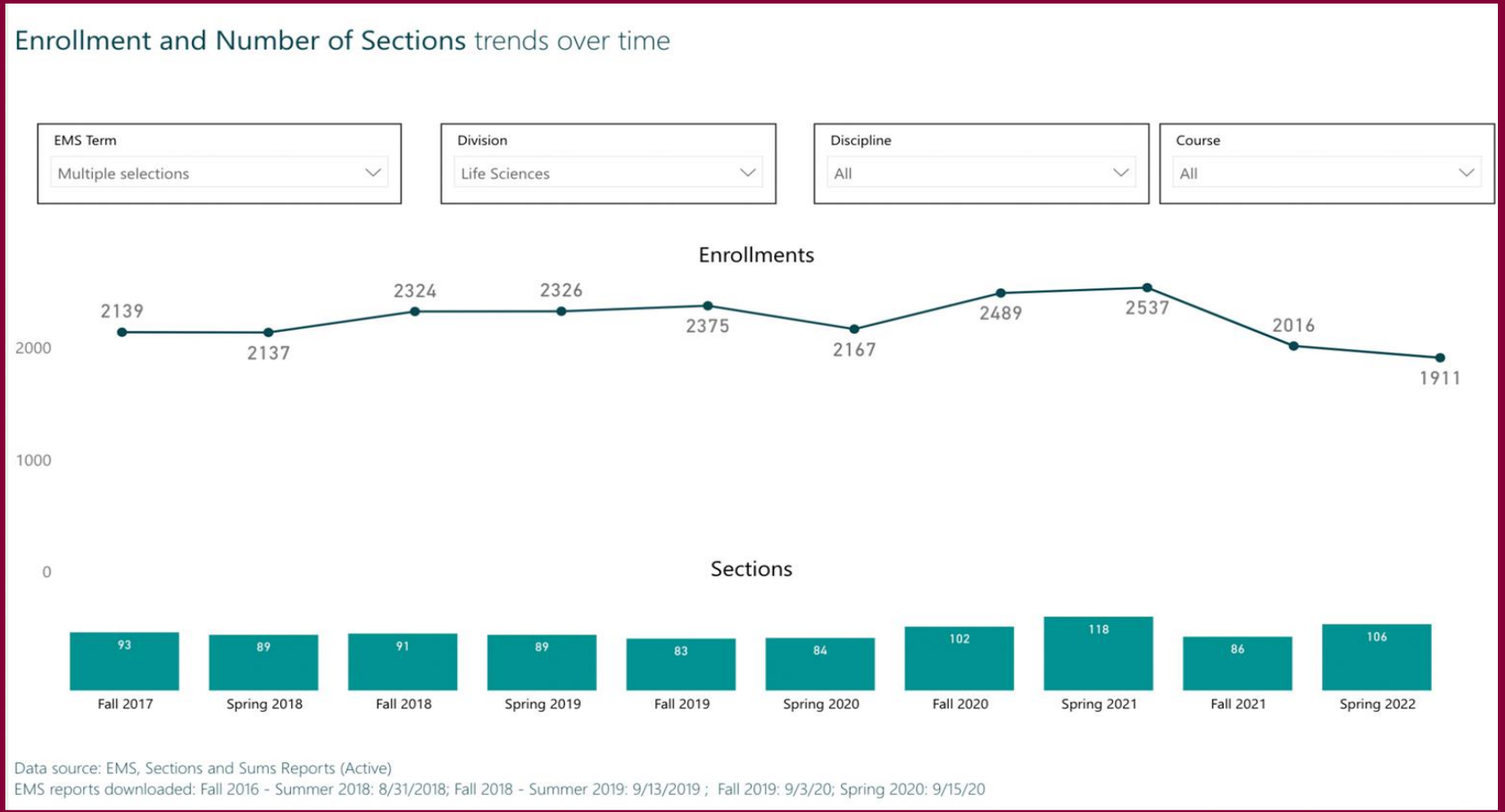
43%+ First Generation



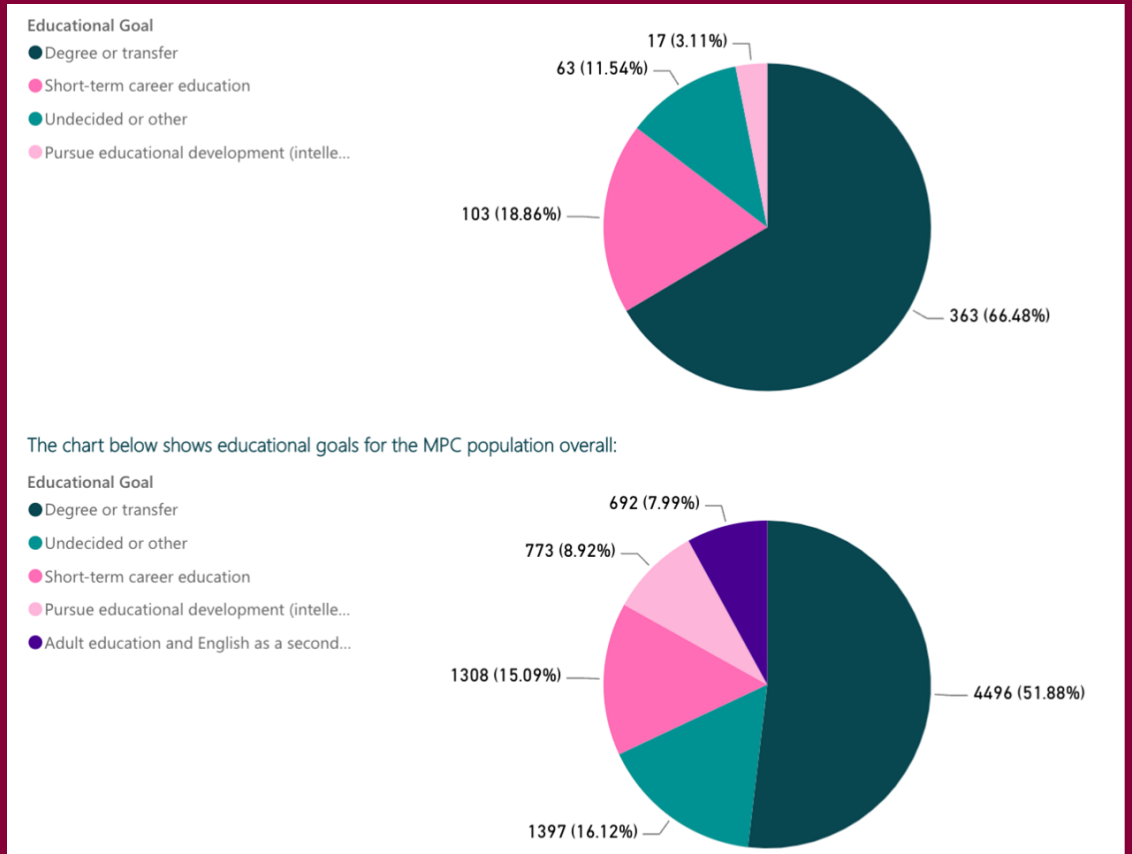
Viability - Student Interest and Student Success

Life Sciences

Enrollment Trends (2017-2022)



Educational Goals

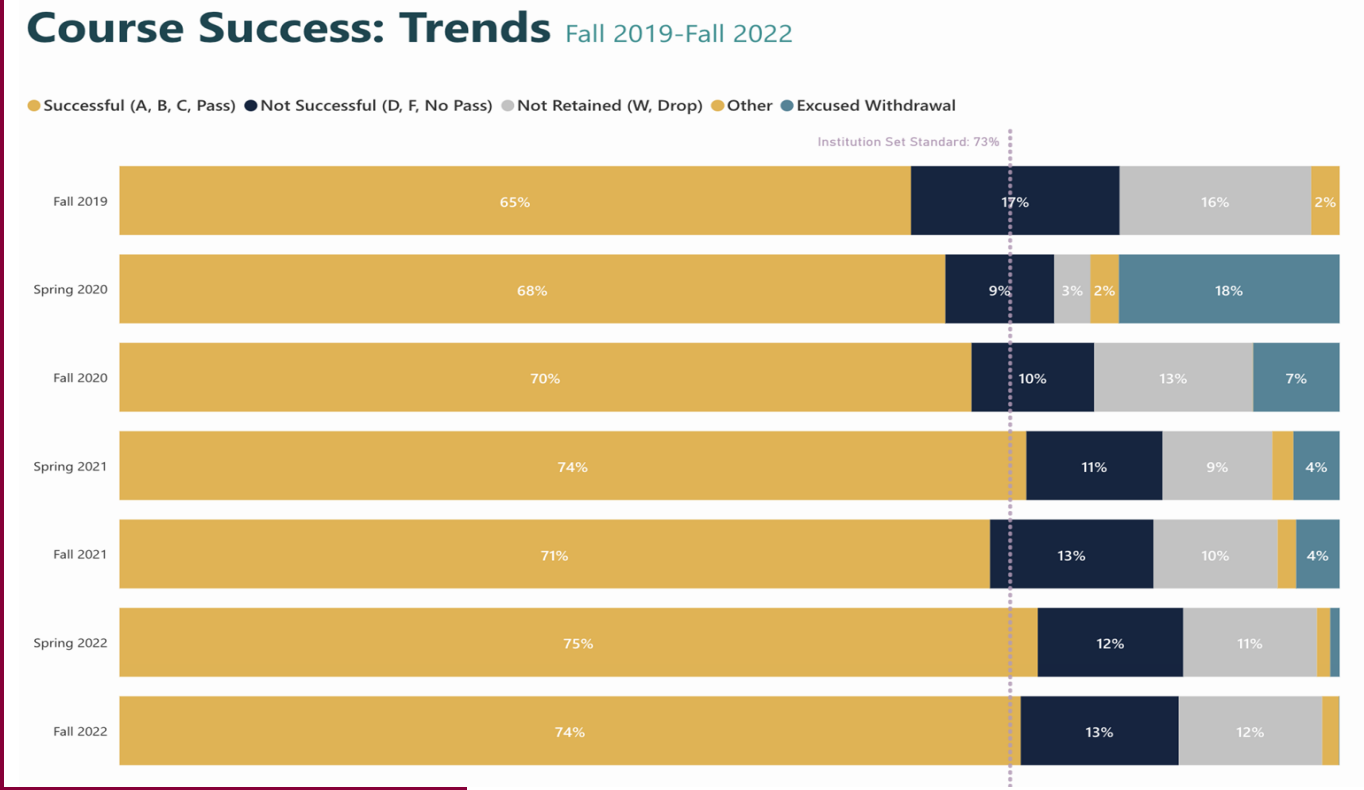


66.5% of LS students have degree or transfer goals

52% of MPC students have degree or transfer goals

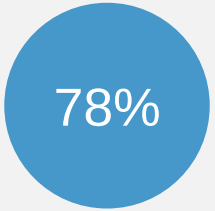
Retention and Success

We met the institutional set standard (73%) in 2021 & 2022, however, this remains an area identified for continuous improvement.



Student Success (A&P to Nursing, 7 semester average, F19-F22)

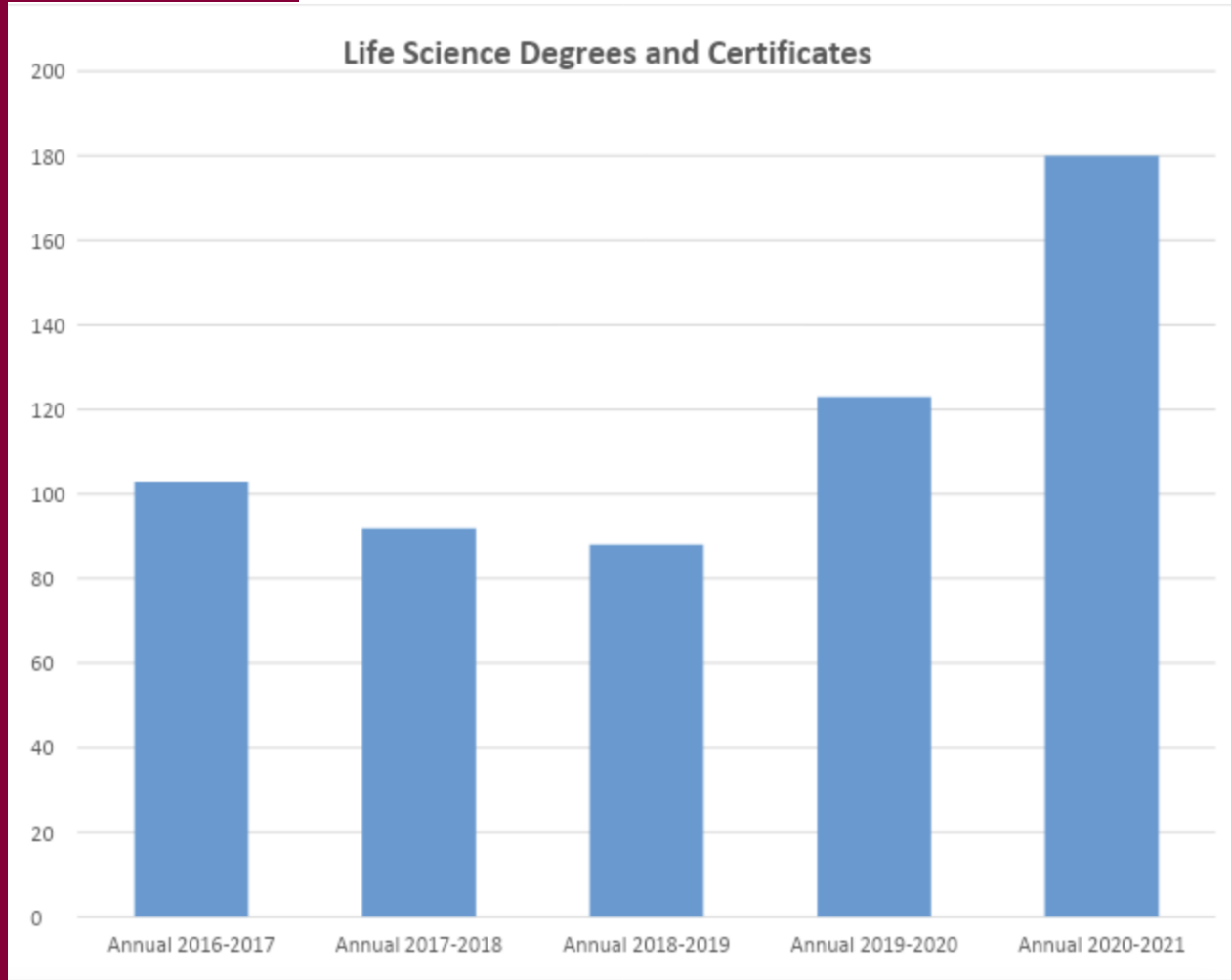
Anatomy



Physiology

Nursing

*many new degrees & certificates
*tracking challenges
*diverse student goals



Program Viability and Support

- Programs discontinued:
  - Family & Consumer Sciences
  - Interior Design (INTD)
- Moved to new CTE Division
  - AUTO, HOSP, FASH
- Moved to Social Sciences Division
  - Human Services (HUMS)
- Program in Revitalization/Growth
  - Horticulture (HORT)
  - Nutrition (NUTF)
  - Medical Assisting (MEDA)

MONTEREY PENINSULA College

What's the S.C.O.R.E?

S-successes
C-challenges
O-opportunities
R-responses
E-equity

Life Sciences
Spring 2023

S.C.O.R.E - Successes

- **New Positions**: Nutrition, Medical Assisting and A&P (**new tenure track faculty**) and Health Sciences Lab Manager (**new shared classified**)

- **New Certificates and Degrees**: BIOL, MEDA, NUTF, HORT

- **Renewed Accreditation:** Dental Assisting (DNTL, 2020)

- **CTE Advisory Boards**, **Guided Pathways Initiative** and **SLO Assessments**: discussions focussed on student success and continuous quality improvement

- **New Equipment**: iWorx data collection equipment (student engagement, transfer success, more collaboration opportunities for PHSO), CEREC porcelain crown milling machine (meet industry and accreditation standards in DNTL), many more…

- **Return to Face-to-Face Labs**: maintained support for state of the art labs including cadaver dissection, microbiology and marine biology, horticulture, clinical lab spaces

- **Improved Facilities**: Marina Lab Renovation (ANAT) + added wifi to demonstration

Updated Lab at the Marina Education Center

Professional labs on the Monterey Campus (DNTL, MEDA, ANAT, PHSO, BIOL)

S.C.O.R.E - Challenges

- **COVID Recovery**:
  - Helping students regain academic skills in a post-Covid 19 landscape
  - Balancing how to meeting online demand while supporting return to campus
  - Student struggling with burnout after Covid, fires and floods. Underrepresented students disproportionately affected.

- **Infrastructure Needs:** LS building on Monterey Campus

- **Equipment/Supplies:** Supply chain disruptions & high cost (MEDA/DNTL/BIOL/A&P)

- **Staffing/Scheduling Challenges:**
  - Reliance on adjunct faculty (HORT and HLTH = 100% adjunct!)
  - Targeting audiences: Day (DNTL), Night (HORT), Marina/Day/Online (MEDA)
  - Incorporating dual enrollment: BIOL, MEDA

- **Wide Range of Student Goals**:
  - Certificates/Degrees vs. prerequisites for transfer/graduate school vs. specific job skills…many do not need a degree or even a full course!

S.C.O.R.E - Opportunities

- **Bond:** may yield a new Health Sciences building in Marina and open space on the Monterey Camps for new endeavors (TBD)
- **New Programs/Collaborations in Monterey:** Possible AS-T in Plant Sciences and/or a 2+2 with CSUMB, in collaboration with Horticulture, Earth Sciences (soil science), Biology (botany) and Business/Math Departments.
- **New Partnerships in Marina/Seaside:** Continue expanding partnerships with regional health and community services (DNTL, NUTF, ANAT); Moving CPR/First Aid to the Emergency Medical Services department (HLTH)
- **New Summer 2023 Student Research Opportunities (BIOL):**
  - Life Sciences Skill Based *Micro* (40 hr) Internship
  - DNA Skill Based Cell Biology Internship

S.C.O.R.E - Responses

- **Service on Committees Focused on Facilities, Hiring, Student Demand & Success, Transfer/Employer Needs**: Facilities, Technology, Safety & emergency prep., TLC, Data Coaching, Equivalency, Allied Health Advisory Committee participation, etc…
- **Engage with Student Support**: HSI STEM, STEM-CEL, MESA, Umoja, Women in STEM & STEM Speaker Series + embedded tutoring & Spanish language tutoring
- **Focus on Teaching**: professional development (online ed, active learning in large lecture classes, diversity in STEM, OEI alignment in NUTF), added more white boards to LF101, new technology, new media (podcasts/videos), projects, innovations (escape room online) & case studies.
- **Flexible Scheduling**: morning, afternoon, evening, Saturday, online & Marina options (ANAT); late start (HLTH, MEDA, ANAT)
- **Dual Enrollment:** Marina High & Seaside Environmental Science (BIOL), Medical Assisting (MEDA) North Monterey County High School & (soon) Marina High!

S.C.O.R.E - Equity

- **Committee Participation Focused on Equity**: IDEA Task Force, LGBTQIA+ and racial ethnic diversity advocacy committee (campus, community and state level engagement), Pride Pack/Club events, Umoja, Women in STEM, SACNAS, etc…

- **Professional Development:** Unlearning Racism in Geosciences & NSF Diversify and Integrate Marine Education at Stations (BIOL) + Diversity in Dietetics & National Conference on Race and Ethnicity (NUTF) + CCC LGBTQIA+ Summit; CORA Black Minds Matter Course; Queer, Trans and Allied Student Summit of the Central Coast & Transforming STEM Teaching Fellowship Program at UC Berkeley (ANAT)

- **Outreach:** CTE Events, Counselling Events, High School Cadaver Lab Tours (Salinas, Seaside, Carmel High, MPC Psychology), connecting students with community/campus resources (HLTH)

- **Engage with Student Support:** Spanish language tutoring (ANAT), Open Lab Hours/Museum Study Space (BIOL/A&P), Library Reserve Desk Resources (ANAT), MESA/STEM-Cel (BIOL), Student Clubs (BIOL, HORT, MEDA/DNTL), Encourage Faculty/Staff to use/learn new languages
- **Actions (ALL DEPTS):** diversity statements, equity displays, Spanish language classes (NUTF/TBD), incorporating gender inclusive language, addressing disparities in health care/nutrition linked to race, ethnicity, gender identity & body diversity. Recognize the need for ongoing, intentional and collaborative efforts.

S.C.O.R.E to S.C.O.R.E.S.S -Student Successes

- **Student Success Exceeding Expectations:**
  - **DNTL** 91-98% success (1-Year Cohort, student/teacher ratio, externships)
  - **MEDA** 93% success (innovate & collaborate, HS, apprenticeships & externships)
  - **HORT** 64-90%, New Stackable COA + 3 new adjunct faculty with industry focus

- **Jobs (MEDA, DNTL, HORT, NUTF):** our CTE students pass board exams, employers specifically seek out our students and students are successful on the job

- **Research (BIOL):** SACNAS Summer Research + F22 conference in Puerto Rico; NSF Research Coordination Networks grant; Course-Based Undergraduate Research Experience

- **Transfer:** CSUMB, UCSC, UCLA, CalPoly, CAL, SJSU, UC Davis, UCLB, UCSD, Sonoma State, Samuel Merritt, SFState, **MCCSN**…and students are ready to excel upon transfer!

Exosomes as Diagnostic and Prognostic Biomarkers in Traumatic Brain Injury

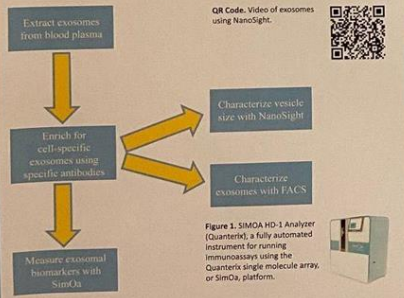
Kevin C. Shaffman, A.S. [1,2]; Jordan Peyer, B.A. [1]; Carina A. Martin, B.S. [1]; Vivian A. Guedes, Ph.D. [1]; Jessica M. Gill, R.N., Ph.D. [1]

[1] National Institutes of Health: National Institute of Nursing Research [2]University of California: Los Angeles

Background

- **Traumatic Brain Injury (TBI)** happens when the brain experiences an external force which causes **disruptions of normal brain function**.
- **Repeated mild TBI, and moderate to severe TBI** have been **linked to neurodegenerative disorders.**
- **Some people with TBI develop a chronic condition** which can last months to years.
- The **severity of the injury** and the **patients prognosis** can be **assessed through biomarkers**.
- **Exosomes** are extracellular nanovesicles **which carry proteins**, RNAs, and other cellular components.
- They are **powerful tool in brain biomarker research** because they allow us to analyze biomarkers of the central nervous system in peripheral body fluids such as blood.
- **Exosomes** can also be isolated based on their cell-type of origin. This could shed light on the underlying mechanism of TBI.
- The **purpose of this experiment** was to **optimize the protocol** for neuronal exosome extraction, and **analyze exosomal biomarkers** derived from neurons, astrocytes, microglia in living patients with sub-acute moderate to serve TBI.

Materials and Methods



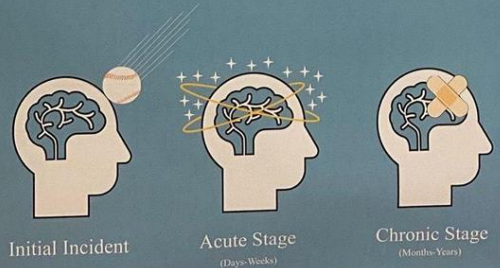
QR Code. Video of exosomes using NanoSight.

Figure 1. SIMOA HD-1 Analyzer (Quanterix), a fully automated instrument for running immunoassays using the Quanterix single molecule array, or SimOa, platform.

Acknowledgements

- The Office of Intermural Training & Education (OITE): The Community College Summer Enrichment Program (CCSEP)
- Erika Barr: CCSEP coordinator
- Monterey Peninsula College

Exosomes are potential **TBI biomarkers** and **shed light** on the underlying pathological **mechanism.**



Results

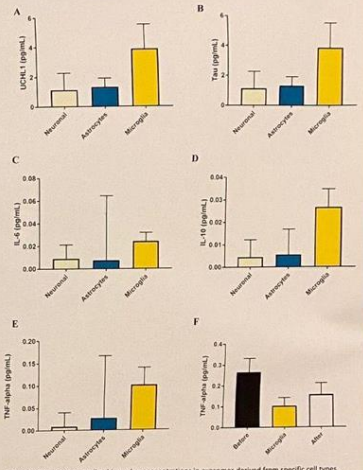


Figure 2. Graphs show median biomarker concentrations in exosomes derived from specific cell types. Biomarker levels were measured using an ultra-sensitive assay. Concentrations of biomarkers were higher in microglia derived exosomes than neuron and astrocyte derived exosomes, expect for IL-6. Bars: IQR (Inter Quartile Range). Abbreviations: UCHL1 (Ubiquitin carboxy-terminal hydrolase L1), IL-6 (Interleukin 6), IL-10 (Interleukin 10), TNF-alpha (Tumor necrosis factor alpha).

Discussion and Direction

- **UCHL1 and Tau**, neuronal injury markers, were **observed in neuronal-, astrocytic-, and microglial-specific exosomes**.
- **Cytokines**, inflammatory markers, were **found** especially **in microglial-derived exosomes.**
- **Exosome-derived proteins** could prove valuable as **prognostic and diagnostic markers** in **TBI**, and **shed light on mechanisms** underlying TBI pathology.
- **Future steps** include **optimization of protocols, validations,** and **analyses** of the informative value of exosomal biomarkers in clinical cohorts.

NIH NURSING RESEARCH

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Email: **keshaffman@gmail.com**
University of California: Los Angeles

"The **MPC Biology program changed my life**- not only are the professors passionate about what they do and the courses interesting, but my experiences in this program inspired me to become a biologist- I'm now doing a PhD in Ecology and Evolution! I wouldn't be here without my start in **MPC Biology**."
- Mia Taylor Waters

*The **Medical Assisting** **program at MPC** taught me the necessary skills and helped prepare me for the realities of working in a clinic. As a current Medical Assistant and Back Office Supervisor, I can't say enough how valuable my experience was at MPC.* **-Britneigh Ray**

Itandehui Rodriguez Arango (DNTL)

This program exceeded my expectations in every way possible. The instructors are excellent, encouraging, and dedicated to ensuring we received the best clinical instruction. I am now working for two amazing periodontists and continue to use the skills I learned in our program every single day.

The curriculum & instructors in the **nutrition program** at MPC have done an amazing job of preparing me with the tools and knowledge I needed to find success after transferring. - Alexander Ray

Krisandra Diaz Mendez

I am so grateful for the opportunity to begin my non-traditional entry into college at MPC. The faculty has given me the confidence, materials, and time necessary for me to be encouraged about my future career as a nurse. From my first counseling appointment, to one-on-ones with my teachers I have felt empowered to achieve my educational goals.

Danieleen Lazo

Enrolling in the Anatomy program here at MPC has been an invaluable experience for me. After finishing my bachelor's degree, I experienced some gap years before settling on a master's program. During these gap years I felt as if I was losing some of my knowledge and knew that once I jumped into a master's program, I would need to make up for lost time. Fortunately, the Anatomy program was an incredibly useful refresher. I encountered subjects I was familiar with and was excited that there were still topics I had not learned. In many ways, this program connected and strengthened the concepts that made me fall in love with science all those years ago. In these pandemic times, I wondered what I would lose to distance learning, but I am pleasantly surprised to say that I have learned more if not the same amount of information. I feel confident in applying these concepts and working with patients towards advancements in medicine.

When writing my…essay for graduate school, I (wrote) about the moment that I realized I wanted to become a nurse….I will never forget the enthusiasm and passion you shared in your anatomy class, and I will be forever grateful for your encouragement and influence in my life. Your anatomy….classes remain some of the most challenging and rewarding classes in my undergraduate studies. I initially struggled with the subject matter and study techniques; but, my desire to learn, your motivating wisdom, and my ability to problem solve resulted in a strong finish! -Nicole Blackburn (A&P)


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Thank you
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