K-Panel: A Reviewer's Perspective

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slides adapted from prior version by Rachelle Crosbie (2023) and with material by Cat Makarewich (CCHMC)

Examples of Mentored Early Career "K" Awards

K01	• Mentored Research Scientist Career Development Award (focus on training in a new field
K08	• Mentored Clinical Scientist Research Career Development Award
K23	• Mentored Patient-Oriented Career Development Award
K99/R00	• Mentored Pathway to Independence Award

Brief overview of eligibility and components

Eligibility Criteria

- **Citizenship**: U.S. citizens or permanent residents (except K99/R00).
- **Degree Requirements**: Varies by award type (e.g., Ph.D., M.D.).
- **Research Experience**: Early-stage investigators or those transitioning to independence.
- **Institutional Affiliation**: Must be affiliated with a U.S. institution.

Application Components

- **Personal Statement**: Outline career goals and commitment to research.
- **Research Plan**: Detailed description of proposed research, including specific aims, background, and significance.
- **Career Development Plan**: Specific activities to enhance skills and knowledge, such as coursework, workshops, and mentoring.
- **Letters of Support**: From mentors, collaborators, and institution, highlighting your potential and the support available.

Tips for a Strong Application

- **Start Early**: Begin preparing at least 6 months before the deadline.
- **Choose the Right Mentor**: Ensure they have a strong track record and relevant expertise.
- **Align Goals**: Make sure your career development plan aligns with your long-term goals.
- **Address Review Criteria**: Highlight your potential, research environment, and mentor's qualifications.
- **Preliminary Data**: Include preliminary data to support your hypothesis and demonstrate feasibility.

K Award Review Criteria

- Each section is scored 1 to 9 scale; overall score

- Candidate
- Previous training, productivity, letters of recommendation, potential for independence
- Research Plan
- Important problem, keeping up/advancing the field, well designed, provide a platform/pilot data for RPG, feasible
- Career Development Plan "Training Plan"
- Expand current skill set, well-integrated with research project, too generic? too much? right elements?
- Mentors, Consultants, & Collaborators
- Scientific expertise, mentoring track record, level of commitment
- Institutional Commitment
- This is important: your past research achievements must have brought you to a status whereby your Division or Department Chair is comfortable to declare that the Institution is ready to offer you space and salary as faculty regardless of the K-award outcome (ideal, strongest letter of Institutional Commitment).

- **ALL ELEMENTS MUST BE INTEGRATED INTO ONE STORY**

some more thoughts on the research plan

- defined, precise, **testable molecular hypothesis** (one arrow mechanism, X->Z where at least connection and one of the two elements is novel)
- always include a hypothesis diagram in the specific aims page and use it as proof of hypothesis fitness: if it takes you more than three arrows and five minutes to draw at BioRender (or similar), you ain't doing it right...
- **mechanism, mechanism, mechanism and again mechanism!** And you better have the tools in place for that mechanism (KO and overexpression)
- just to reiterate the prior point but maybe be a little less boring: if you are not testing sufficiency and requirement in your overarching hypothesis and each aim, you ain't doing it right...
- **aims should never be interdependent but always complementary**....example: if hypothesis is X -> Z, aim 1 tests requirement/sufficiency of X, aim 2 tests requirement/sufficiency of Y as novel possible mediator of X to Z
- **the project needs to be integrated with your career development plan**...example related to the prior one: you are trained in Z, but you need further training in X and Y -> Mentor in X and co-Mentor in Y

some more thoughts on the training plan

- your training plan is the leading training plan, it must contain everything! do not leave elements only in the mentor's training plan
- research skills training according to the project aims
- career development skills (focus on what is needed to apply for a faculty position: grants, papers, mentorship, chalk talks, networking for open faculty positions, etc...
- coursework, workshops and conferences (be precise and mention details!)
- IMPORTANT: how will the project and the training plan differentiate you from your current mentor? thanks to the training plan and the mentoring team, which findings will the project provide for your first R01? what are the aims of that R01, and why is it not overlapping with any of your present and future R01s by your Mentor?

-> indeed, in either your Mentor's letter or in the mentor's training plan, or in both (better!), the Mentor SHOULD have a clear statement related to the fact that the project idea is ONLY YOURS and that they WILL NOT pursue this line of investigation now or in the future!

one more note about the training plan by my colleague Cat Makarewich

reviewers want to see **tangible** things in the training plan—timelines, milestones, and ways career development will be assessed. Having **clear, structured goals** makes it much easier for them to see whether you're actually on a solid trajectory toward independence. They want specifics, like **when** you plan to submit manuscripts, **when** you will apply for independent funding (**what** exact funding mechanism?), **how** you will gain proficiency in a new technique and **how** you will measure this (Be able to perform tasks independently? Be able to teach this technique to others?)

YOUR Biosketch-Storytelling-Don't miss this opportunity!

Example

<u>Publications:</u> impact on the field, impact on your training, outline the number of papers, the number of first and second author, co-author, mention the impact factor, mention the effort for this kind of study, put these into context

<u>Who are you as a scientist?</u> What skillset do you need to achieve your big goals? What are you passionate about? Have you mentored others?

<u>What was your path/scientific journey?</u> Choice of labs, chose projects, stayed at the same institute or moved? What is your narrative?

<u>Gaps in productivity?</u> Covid, breeding mice, disaster in the colony, other challenges

Mentor/collaborator biosketch

The mentors' expertise and commitment to the candidate should be evident.
YOU must read and review mentor biosketch!!
It should be tailored to the K proposal

If Assistant Professor, consider asking a more senior faculty member to be on the team

The mentoring team should have complementary skills well matched to candidate career development plans

Mentors should have strong research and strong mentoring track records.

Mentors should give metrics and data on prior trainees

➔ RECOMMENDATION: Establish team 6-mos before due date. Ask for 30-min committee meeting to review specific aims page, mention the process in your training plan, include a statistician.
Revise specific aims page and meet again.

Mentoring Team

Table of Mentors/collaborators/advisors
List of all members
Role
Affiliation
Expertise-few words, phrases
Contribution to the training plan, career development (few points per member)
Format of interactions

Ideas: leadership, project management, people management, budgets, how to mentor, mentor-mentee compacts, interviewing, networking, marketing, preparing for chalk talks

IMPORTANT: you must justify every member of your mentoring team with not only a role in career development, but also the project conduction...example: Mentor X will train you in assay/topic/model X in the project and train you in skill X for career development; co-Mentor Y is also required, because they will train you in assay/topic/model Y in the project and train you in skill Y for career development, etc...

Some common critiques are:

- Issues related to rigor/reproducibility
  - Omission of controls or the rationale for controls
  - Power calculations omitted
  - N-values omitted in methods or in preliminary data
- Legends are sparse, don't mention n-values, not visible, poor quality data
- Sex as a biological variable not addressed sufficiently
- Alternative approaches underdeveloped
- What if aim doesn't work?

Some common critiques are generic training plan

- Training plan
  - NOT integrated into aims
  - underdeveloped
  - doesn’t say how much time/effort will be devoted to each activity
  - doesn’t give details of conferences, seminars, time spent with mentors
  - includes virtual meetings with no details
- Mentor letters
  - sound like they were possibly written by the same person (generic)
  - don’t outline the training plan (cross-referencing within the grant is needed)
  - mentor training history mentions number of trainees, but not much else
- Biosketch
  - thin (this is a lost opportunity!)
  - underdeveloped
  - Needs context and storytelling
- Chair letter
  - doesn’t provide concrete details

Training Plan-one example (there are many ways to represent this)

Table

	Year 1	Year 2	Year 3
Experiments/Objectives X Y Z	 effort%		
Training/Career Development Conferences Mentoring meetings Coursework/workshops Extramural training Publication prep Develop aims R01	 effort %		

Training Plan-another example!

Table Timeline of Research and Career Development

	%effort/activity	Quarters 1-4
K99 Year 1 Year 2 R00 Year 3 Year 4 Year 5	 Research (X%), course (5%)	

→ Consider a schematic illustration of your training plan with objectives the next slide has a list of training grants from NIH and other funding agencies compiled by Cat Makarewich (CCHMC) on January 2025

for NIH, NHLBI is reported. It is important to check online which K awards are granted by each Institute and with which characteristics/focus and **ALWAYS DISCUSS with the PO in advance!**

Grant	Degree requirement	Citizenship or permanent residency requirement	Award project period	Budget	Relevant research	Official grant announcement*
AHA Career Development Award	MD (or equivalent) or PhD	No	3 y	$77k/year	Cardiovascular, cerebrovascular and brain health.	2025 Career Development Award
NSF Early Career Development Program (CAREER)	MD (or equivalent) or PhD, holds an untenured assistant professor position	No	5 y	>$400k in total	All research fields	https://new.nsf.gov/funding/opportunities/career-faculty-early-career-development-program
VA Career Development Award (CDA-2)	MD (or equivalent) or PhD, nominated by a VA facility.	Yes, citizen only	3-5 y	?	All research fields	https://www.research.va.gov/funding/cdp.cfm
Burroughs Wellcome Fund Career Awards at the Scientific Interface (CASI)	MD (or equivalent) or PhD, 12-60 months of postdoctoral research and untenured faculty position, a letter of intent is required	No	5 y	$560k in total	All biological sciences	https://www.bwfund.org/funding-opportunities/interfaces-in-science/career-awards-at-the-scientific-interface/
Sarnoff Scholar Award	Physician scientist, Sarnoff fellow	No	2 y	$105k/year	Cardiovascular research	https://www.sarnofffoundation.org/page/Scholar_Award
TRDRP New Investigator Award	MD (or equivalent) or PhD	No	3 y	$300k/year	Tobacco-related cardiovascular disease (CVD) and cerebrovascular accident (CVA) or stroke	https://trdrp.org/funding-opportunities/award-mechanisms/new-investigator-award.html
Additional Ventures, Catalyst to Independence Award	MD (or equivalent) or PhD, more than 1 year of postdoctoral research, a letter of intent is required	No	5 y	$1M in total	Topics relevant to single ventricle heart disease	https://www.additionalventures.org/initiatives/biomedical-research/funding/catalyst-to-independence-award/
Additional Ventures, Single Ventricle Research Fund (SVRF)	MD (or equivalent) or PhD, a letter of intent is required	No	3 y	$600k in total, Independent Investigator $300k in total, Career Development Tracks	Research efforts relevant to single ventricle heart disease	https://www.additionalventures.org/funding/single-ventricle-research-fund/
Hanna H. Gray Fellows Program	MD (or equivalent) or PhD, less than 24 months of postdoctoral training	No	2-4 y, postdoc 4 y, faculty	$100k/year, postdoc $270k/year, faculty	All research fields	https://www.hhmi.org/programs/hanna-h-gray-fellows
NHLBI K99/R00**	MD (or equivalent) or PhD, less than 48 months of postdoctoral training	No	K phase: 1-2y R phase: 3y	K phase, $125k/year R phase: $249k/year	NHLBI's mission areas	PA-24-193 PA-24-194 PA-24-195
NHLBI K01**	MD (or equivalent) or PhD	Yes	3-5 y	$130k/year	NHLBI's mission areas: Epidemiologic, biostatistics, outcomes, and implementation science research in humans	PA-24-175 PA-24-176 PA-24-177
NHLBI K08	Clinical doctoral degree	Yes	3-5 y	$125k/year	NHLBI's mission areas: Basic and non-patient oriented human subjects research	PA-24-181 PA-24-182 PA-24-183
NHLBI K22	MD (or equivalent) or PhD, less than 5 years conducting full-time research in the NHLBI Division of Intramural Research	Yes	Extramural Phase, 3 y	$249k/year	NHLBI's mission areas	PAR-24-209 PAR-24-211
NHLBI K23	Clinical doctoral degree	Yes	3-5 y	$150k/year	NHLBI's mission areas: Patient-Oriented clinical, biomedical or behavioral research	PA-24-184 PA-24-185 PA-24-186
NHLBI K25	Advanced degree in a quantitative area of science or engineering (e.g., MSEE, PhD, DSc)	Yes	3-5 y	$115k/year	See program announcement	PA-24-190 PA-24-191 PA-24-192

** = MOSAIC (**M**aximizing **O**pportunities for **S**cientific and **A**cademic **I**ndependent **C**areers) participating grant; ALL types of research are relevant for MOSAIC K01