

Understanding of the Biological Phenomena and Responses at the Early Life Stages to Improve the Quality of Health and Medical Care

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Application Guideline P. 22

<https://www.amed.go.jp/content/000060731.pdf>

Understanding of the Biological Phenomena and Responses at the Early Life Stages to Improve the Quality of Health and Medical Care



Research and Development Objective

Molecular understanding of the biological phenomena and responses at the early life stages to improve the quality of health and medical care

Goals and Objectives

This R&D objective aims to deepen our understanding of the various issues in early life stages and to generate seeds for better health and medicine in the future by combining a wide range of methods, including omics, imaging, and mathematical/data analysis, to gain a quantitative understanding of the impact of early exposure to various environmental factors on life at later stages. Specific goals are as follows:

- (1) Understanding: Improve our understanding of the biological phenomena and responses at the early stages of life and clarify the molecular mechanisms involved
- (2) Technology: Establish platform technologies to enable high-precision measurements that can be applied to the studies on the early stages of life and develop their applications
- (3) Control: Identify key response factors at the early stages of life and generate seeds for preventive, diagnostic, and therapeutic technologies

Outline of solicitation



Health and disease at the early stages of life
(between fertilization and young adulthood)

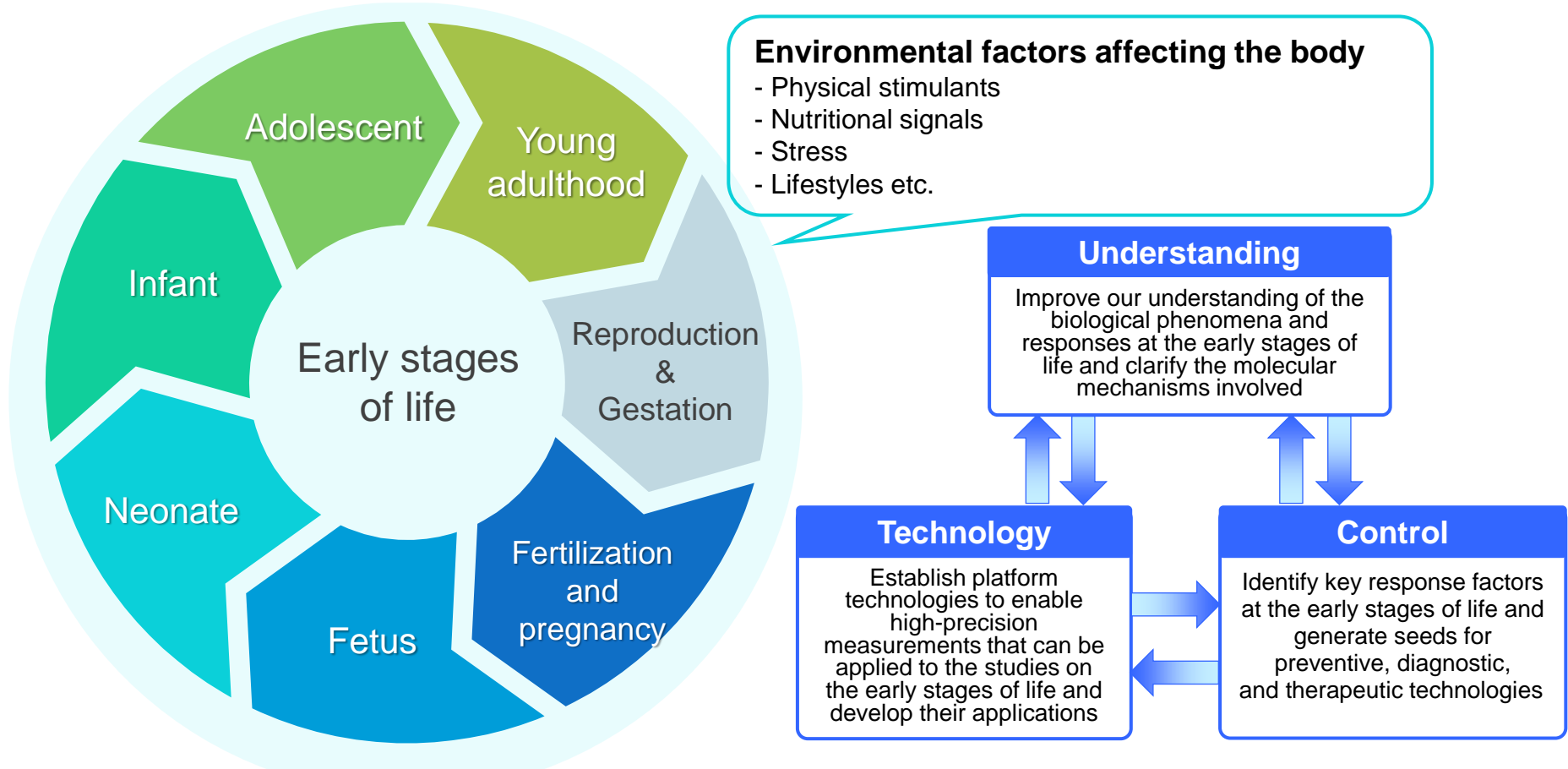
1. Various **biological and environmental factors** are involved
 - E.g.: Malnutrition during pregnancy and lower birthweights
 - Weight loss or obesity during young adulthood due to inadequate/excessive nutritional intake
 - Immune responses such as allergic disease
 - Issues of reproductive health
 - Brain dysfunction such as developmental disorders etc.
2. These factors **could be risk factors for disease during middle-to-late stages of life (from adulthood into old age)**
3. The risk factors **can be passed on to subsequent generations**



Research focusing on the early stages of life
is expected to contribute to improved quality of life (QOL) across all stages

Image of the R&D area

The goal of this R&D area is to develop a comprehensive understanding of the effect biological and environmental factors have on the body in the early stages of life in order to elucidate living phenomena towards improving future health and medical.



Selection policy



- (1) Improve our understanding of the biological phenomena and responses at the early stages of life and clarify the molecular mechanisms involved
- (2) Establish platform technologies to enable high-precision measurements that can be applied to the studies on the early stages of life and develop their applications
- (3) Identify key response factors at the early stages of life and generate seeds for preventive, diagnostic, and therapeutic technologies

AMED-CREST

AMED invites proposals for innovative basic research with **a multidisciplinary approach** to improving our quantitative understanding of the biological phenomena and responses at the early stages of life and clarifying the mechanisms involved.

PRIME

AMED invites proposals in the R&D areas as described in the AMED-CREST program, particularly for **highly innovative research**.

AMED welcomes proposals for challenging projects that could lead to new breakthroughs or develop novel technologies that may contribute to basic research of this R&D.

Examples of R&D proposals (1)



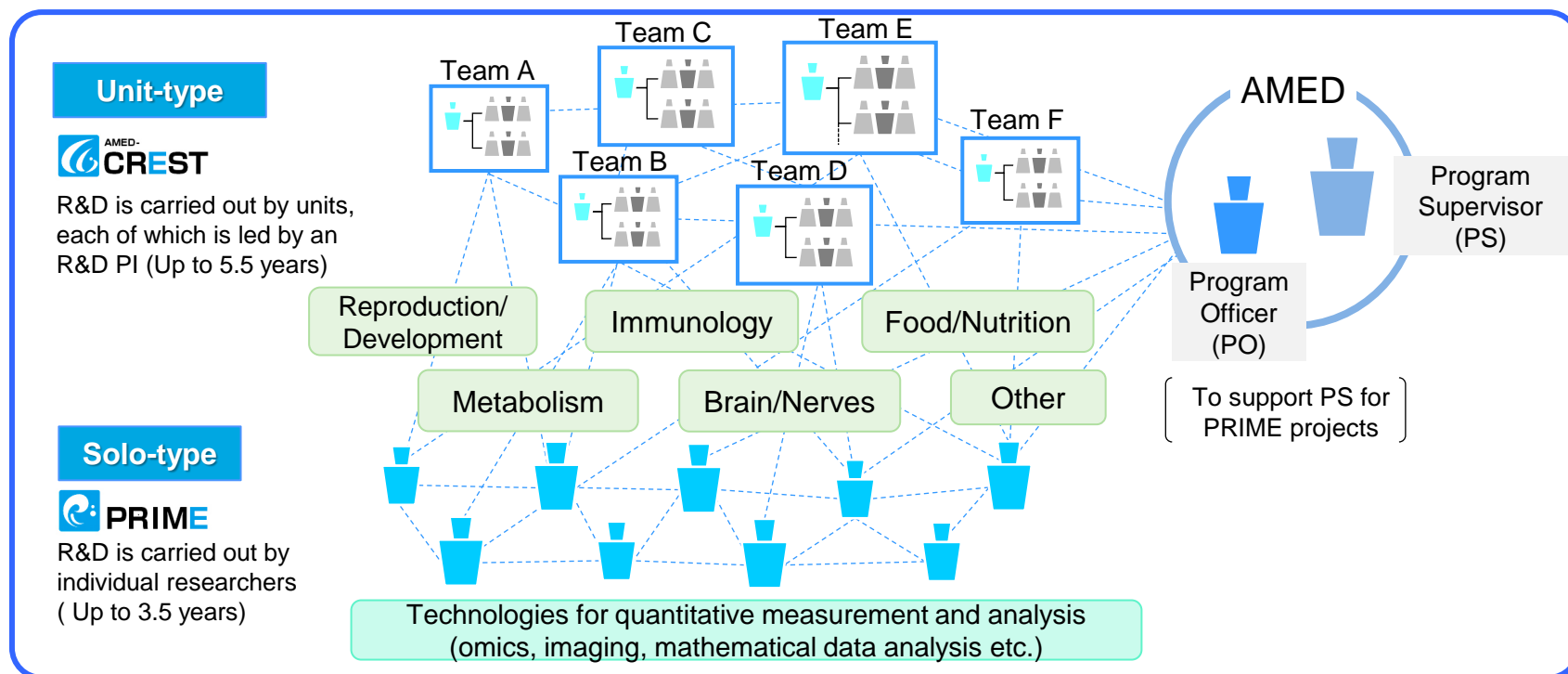
- Understand the mechanisms underlying biological responses at the early stages of life in animal models and humans
- Clarify the effects that biological responses at the early stages of life have on metabolism and circulatory organs at the middle-to-late stages of the life course
- Clarify the mechanisms by which biological responses at the early stages of life have an impact on health in subsequent generations
- Develop more sophisticated multi-omics and imaging technologies and develop applications for cohort samples etc.
- Obtain spatiotemporal data using model animals, organoids, etc. and develop comprehensive analytical technologies

Examples of R&D proposals (2)

- Explore and identify diagnostic markers and intervention targets for diseases caused by factors in the early stages of life
- Discover technology seeds for interventions (e.g., nutrients, drugs) for diseases caused by factors in the early stages of life
- Develop technologies for the precise control of epigenomic status or protein functions that are potential interventional targets

R&D unit organization

- Ideally the research will **combine a number of different research fields into a single research unit**
- AMED welcomes proposals from researchers who **collaborate actively with other research groups in different fields** during the course of their research
- AMED welcomes innovative new proposals from different research fields as long as they are scientifically reasonable



R&D costs and R&D period



In order to select a wide variety of R&D projects to deepen our understanding of the various issues in early life stages, AMED is soliciting research proposals according to the following conditions.

Type of proposal	R&D funds	R&D period	No. of projects to be selected
AMED-CREST (unit-type)	300 million yen or less (entire direct costs)	Up to 5.5 years	Around 2–4 projects
PRIME (solo-type)	40 million yen or less (entire direct costs)	Up to 3.5 years	Around 8–12 projects

Message from PS (for applicants)



- AMED invites proposals for **innovative basic research** with a multidisciplinary approach to improving our quantitative understanding of the biological phenomena and responses at the early stages of life and clarifying the mechanisms involved. We also invite proposals for research into biomarkers to evaluate biological responses or the **discovery of platform technology seeds** for the regulation of these responses.
- Ideally the research will **combine a number of different research fields into a single research unit**. Eager collaboration with other research groups in different fields is also expected during the course of promoting research.
- AMED welcomes **proposals aimed at developing our understanding in humans**, rather than research that only focuses on model systems.
- AMED does not require the participating researchers in the applications to be currently engaged in research into the early stages of life. We welcome innovative new proposals that are scientifically rational.

Message from PO

(for applicants)



- AMED welcomes proposals for **challenging projects that could lead to new breakthroughs or develop novel technologies** that may contribute to basic research of this R&D (for example, development of new experimental systems using model animals including invertebrates or imaging technologies that allow minimally invasive evaluation of biological responses).
- AMED expects **challenging and innovative proposals** that are not fixated on previous results.
- While PRIME is a type of research in which R&D is carried out by individual researchers, it is hoped that regardless of their area of expertise researchers will **actively develop networks for the future application of their research outcomes** through collaborations with other research groups in the same or different fields. PRIME requires researchers who are **motivated** in this way.

AMED awaits innovative and creative proposals.

*Researchers new to this research field
are also welcomed to apply.*

We are looking forward to your application.