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Overview of the Mental Retardation Developmental Disabilities Research Center (MRDDRC) at Kennedy Krieger Institute (Johns Hopkins University School of Medicine)

M. Denckla*

Kennedy Krieger Institute Inc., Mental Retardation Research Center, 707 North Broadway, Baltimore, MD 21025, USA

There are five cores funded by P30 HD24061, now in its 14th year. There is also a new program development component that has been in effect since 1998 and is currently devoted to its second young Investigator.

Core A (administrative/biostatistical) provides through the administration of Dr. Denckla (MRDDRC) pre-approved, filtered (and scientifically shaped) access to Dr. Scott Zeger, who oversees assignments of biostatistical analyses to appropriate members of the Department he directs (in the Bloomberg School of Public Health). This core has permitted many young new Investigators with relatively small budgets to access a varied and sophisticated "menu" of designs and analysis methods.

Core B (genetics) provides a broad range of cytogenetic and molecular (including microarray technology) consultations of clearly high relevance to studies of mental retardation in particular.

Core C (neuroscience) is divided into (a) an excitatory amino acids focus and (b) a fatty acids/cholesterol metabolic focus, each of which draws upon the expertise of a renowned laboratory, that of (a) Dr. Michael Johnston and (b) Dr. Hugo Moser, facilitating research on these important receptor and metabolic pathophysiologies.

Core E (neuroimaging) has since 1998 undergone the greatest expansion, with added funding from core D that previously existed (hence the skipped letter designation). Headed by an M.D., Ph.D., Dr. Michael Kraut (neuroradiologist), this core offers investigators a broad "menu" of expertise, including functional magnetic resonance imaging, magnetic resonance spectroscopic imaging, volumetric-anatomic and diffusion-tensor-anatomic imaging. The expanded roles and university−wide impact of core E reflect the creation over 2 years ago of the F.M. Kirby Imaging Center within Kennedy Krieger Institute, to which has been added resources of the National Center for Research Resources (NCRR) grant to add a 3.0 T magnet (among other enhancements) and a pediatric General Clinical Research Center (GCRC) to support investigators in acquisition and measurement of MRI scans.

Core F (behavioral science) since its inception has provided consultation and training in applied behavior analysis so as to make possible the neuroimaging acquisitions (fMRI, aMRI, etc.) relevant to our target (MR/DD) populations. In addition, since 1998 direct neuropsychological measurements of profiles associated with various syndromes have been provided by core F, a research service greatly expanded by the pediatric GCRC funding available.

New program development currently undertaken involves behavioral (procedural learning) and neuroimaging (fMRI and aMRI, cerebellum and frontal lobe) characteristics of autism (Stewart Mostofsky, M.D., pediatric neurologist).

Some current and representative topics of users of our MRDDRC are:

- signal transduction mechanisms and lead toxicity (core C),
- accuracy of recall of children with mental retardation (core F),
- neuropeptide gene expression in cultured cortical neurones (core A),
- magnetic resonance spectroscopy imaging and fMRI of children with NF- I (core E),
- genes, anapleudy and mammalian development (core B),
- treatment of lead-exposed children (core A),
- white matter in Rett syndrome (cores A and E).

* Tel.: +1-443-923-9250; fax: +1-443-923-9255.
E-mail address: denckla@kennedykrieger.org (M. Denckla).

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