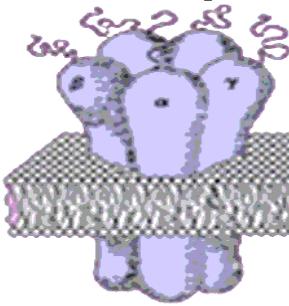
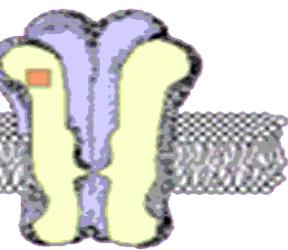


Benzodiazepines  
Agonists  
Antagonists  
Inverse agonists



GABA Agonists  
Muscimol, THIP  
GABA Antagonists  
Bicuculline



Convulsants  
Picrotoxin  
TBPS  
Steroids

Barbiturates  
Steroids  
Alcohol

### The GABA<sub>A</sub>/Benzodiazepine Receptors

# Angel L. de Blas

Professor and Department Head

PhD. Indiana University-Bloomington, 1978

[deblas@oracle.pnb.uconn.edu](mailto:deblas@oracle.pnb.uconn.edu)

### Molecular Characterization of GABAergic Synapse, GABA<sub>A</sub>/Benzodiazepine Receptors and Endogenous Benzodiazepines in the Brain

## Research Interests:

- GABAergic synapse formation.
- Molecular mechanisms involved in synaptic localization of GABA<sub>A</sub> receptors.
- Subunit Composition of GABA<sub>A</sub> receptors in various brain regions.
- Relationship between ligand-binding specificities and subunit composition.
- mRNA and Protein expression of GABA<sub>A</sub> receptor subunits.
- GABA<sub>A</sub> Receptor subunit-specific antibodies.
- GABA<sub>A</sub> receptor changes during aging.
- Characterization of endogenous brain benzodiazepines.

## Selected Publications:

- Gutierrez, A., Khan, Z.U. and De Blas, A.L.: Immunocytochemical Localization of Gamma-2 Short and Gamma-2 Long Subunits of the GABA<sub>A</sub> Receptor in the Rat Brain. *J.Neuroscience*. **14**:7168-7179, 1994.
- Khan, Z.U., Gutierrez, A. and De Blas, A.L.: The Subunit Composition of a GABA<sub>A</sub>/Benzodiazepine Receptor from Rat Cerebellum. *J. Neurochem.* **63**:371-374, 1994
- Gutierrez, A., Khan, Z.U. Morris, S.J. and De Blas, A.L.: Age-Related Decrease of GABA<sub>A</sub> Receptor Subunits and Glutamic Acid Decarboxylase in the Rat Inferior Colliculus. *J.Neurosci.* **14**:7469-7477, 1994.
- Miralles, C.P., Gutierrez, A., Khan, Z.U., Vitorica, J. and De Blas, A.L.: Differential Expression of the Short and Long Forms of the Gamma-2 Subunits of the GABA<sub>A</sub>/Benzodiazepine Receptors. *Mol. Brain. Res.* **24**:129-139, 1994.
- Fernando, L.P., Khan, Z.U. McKernan, R.M. and De Blas, A.L.: Monoclonal Antibodies to the Human Gamma-2 Subunit of the GABA<sub>A</sub>/Benzodiazepine Receptor. *J. Neurochem.* **64**: 1305-1311, 1995.

- Gutierrez, A., Khan, Z.U., and De Blas, A.L.: Immunocytochemical Localization of Alpha-6 Subunit of the GABAA Receptor in the Rat Nervous System. *J. Comp. Neurol.* **365**: 504-510, 1996
- Khan, Z.U., Gutierrez, A. and De Blas, A.L.: The Alpha-1 and Alpha-6 Subunits can Coexist in the Same Cerebellar GABAA Receptor Maintaining their Individual Benzodiazepine Binding Specificities. *J. Neurochem.* **66** :685-691, 1996.
- De Blas, A.L.: Brain GABAA Receptors Studied with Subunit-Specific Antibodies. *Mol. Neurobiol.* **12** :55-71, 1996.
- Gutierrez, A., Khan, Z.U., Ruano, D., Miralles, C., Vitorica, J. and De Blas, A.L.: Aging-Related Subunit Expression Changes of the GABAA Receptor in the Rat Hippocampus. *Neurosci.* **74** :341-348, 1996.
- Khan, Z.U., Gutierrez, A., Mehta, A.K., Miralles, C.P., and De Blas, A.L.: The Alpha-4 Subunit of the GABAA Receptors from Rat Brain. *Neuropharmacol.* **35** :1315-1322, 1996.
- Gutierrez, A., Khan, Z.U., Miralles, C.P., Mehta, A.K., Ruano, D., Araujo, F., Vitorica, J. and De Blas, A.L.: GABAA Receptor Subunit Expression Changes in the Rat Cerebellum and Cerebral Cortex During Aging. *Mol. Brain. Res.* **45**:59-70, 1997.
- Li, M. and De Blas, A.L.: Coexistence of Two Beta-Subunit Isoforms in the Same Gamma Aminobutyric Acid Type A Receptor. *J. Biol. Chem.* **272**:16564-16569, 1997.
- Homanics, G.E., Harrison, N.L., Quinlan, J.J., Krasowski, M.D., Rick, C.E.M., De Blas, A.L., Mehta, A.K., Kist, F., Mihalek, R.M., Aul, J.J. and Firestone, L.L.: Normal Electrophysiological and Behavioral Responses to Ethanol in Mice Lacking the Long Splice Variant of the Gamma-2 Subunit of the Gamma-Aminobutyrate type A Receptor. *Neuropharmacol.*, **38**: 253-265, 1999.
- Miralles, C.P., Li, M., Mehta, A.K., Khan, Z.U. and De Blas, A.L.: Immunocytochemical Localization of the  $\beta$ 3 Subunit of the Gamma-Aminobutyric Acid type A Receptor in the Rat Brain. *J. Comp. Neurol.*, **413**:535-548, 1999.
- Christie, S.B., Li, R.W., Miralles, C.P., Riquelme, R., Yang, B.Y., Charych, E., Yu, W., Daniels, S.B., Cantino, M.E., De Blas, A.L.: Synaptic and extrasynaptic GABAA Receptor and Gephyrin Clustering. In "Changing Views of Cajal's Neuron" (Azmitia E, DeFelipe J, Jones E, Rakic P and Ribak C, eds). *Prog. Brain. Res.* **136**:157-179, 2002.
- Christie, S.B., Miralles, C.P. and De Blas A.L.: GABAergic Innervation Organizes Synaptic and Extrasynaptic GABAA Receptor Clustering in Cultured Hippocampal Neurons. *J. Neurosci.* **22**:684-697, 2002.
- Riquelme, R., Miralles, C.P. and De Blas, A.L.: Bergmann glia GABAA Receptors Concentrate on the Glial Processes that Wrap Inhibitory Synapses. *J. Neurosci.* **22**:10720-10730, 2002.
- Christie, S.B. and De Blas, A.L.: Alpha-5 Subunit-Containing GABAA Receptors Form Clusters at GABAergic Synapses in Hippocampal Cultures. *Neuroreport* **13**:2355-2358, 2002.
- Christie, S.B. and De Blas, A.L.: GABAergic and Glutamatergic Axons Innervate the Axon Initial Segment and Organize GABAA Receptor Clusters of Cultured Hippocampal Pyramidal Cells. *J. Comp. Neurol.* **456**:361-374, 2003.

## More on Our Laboratory Research

### Lab Personnel