Dr. Gordon D. Niswender is the 2005 recipient of the Carl G. Hartman Award (funded by Johnson & Johnson Pharmaceutical Research & Development, LLC), the highest honor of the Society for the Study of Reproduction. It is given in recognition of a career of research and scholarly activities. Dr. Niswender has been recognized as a leader in the field of reproductive biology for over three decades and has amassed an outstanding record as a scientist, colleague, and mentor, and has provided exceptional service to the academic and scientific communities. Below is a summary provided by Dr. Niswender describing his research career.

Upon completion of a B.S. degree in agricultural education, Dr. Niswender had accepted a position teaching in Pinedale, Wyoming, where he could enjoy his hobby of team-roping. However, just before graduation in 1962 he attended a seminar given by Dr. James Wiltbank and by noon that day had resigned his new teaching position and had agreed to join Dr. Wiltbank at the University of Nebraska to study for a Masters of Science degree. It was during these early days that he developed what was to be a lifetime interest in the corpus luteum. To pursue this interest, in 1964 Dr. Niswender joined Dr. Phillip Dzuik at the Animal Genetics Laboratory at the University of Illinois and began work for his Ph.D. degree. Upon completion of his PhD at the University of Illinois (1967), Dr. Niswender went to the University of Michigan for postdoctoral training with Dr. Rees Midgley who had developed the first radioimmunoassays for luteinizing hormone (LH) and follicle-stimulating hormone (FSH) for use in humans. During the five years as a postdoctoral fellow and assistant professor at the University of Michigan Dr. Niswender developed radioimmunoassays for LH and FSH for use in sheep, cattle, pigs, rats and monkeys and for progesterone and testosterone in samples from all species. These tools allowed reliable quantification of reproductive hormones in the blood of domestic animals. Once the assays were available Dr. Niswender made the antibodies available to all academic researchers who requested them, thousands of shipments to over 600 laboratories in more than 30 countries.

To understand how the functions of the corpus luteum were regulated he next focused on quantifying blood flow to the ovary and evaluating the numbers of occupied and total luteal receptors for LH. All three of these parameters were highly correlated with serum levels of progesterone. The fate of occupied hormone receptor complexes was also studied and it was determined that the predominant mechanism for de-stimulating a cell after LH binding was internalization of the hormone receptor complex rather than dissociation of the hormone from the receptor. Methods to quantify luteal receptors for $PGF_{2}\alpha$ and PGE_2 were also developed and used to provide new information regarding luteolysis and maternal recognition of pregnancy.

Next was a series of experiments which demonstrated that there were two types of steroidogenic luteal cells based on morphological and biochemical data. Small luteal cells contained receptors for LH and responded to activation of protein kinase A (PKA) with a 10- to 20-fold increase in progesterone production. Large luteal cells produce most of the progesterone, apparently in a constituitive manner, and do not respond to LH or activation of PKA with increased secretion of progesterone. However, large luteal cells contain the receptors for $PGF_{2}\alpha$ and PGE_2. Binding of $PGF_{2}\alpha$ to its receptor activates two independent second messenger pathways with the PKC pathway being anti-steroidogenic and calcium influx causing apoptosis and cell death.

Methods were next developed to study expression of the genes which regulate the steroidogenic pathway including those which regulate low density lipoprotein receptor, high density lipoprotein binding protein, hormone sensitive lipase, P450 cholesterol side chain cleavage, and 3β-hydroxysteroid dehydrogenase. In general, LH and growth hormone stimulated chronic expression of these genes while $PGF_{2\alpha}$ treatment decreased expression. However, none of these steroidogenic components appeared to be responsible for the acute regulation of progesterone synthesis. Since cholesterol transport from the cytosol to the inner mitochondrial membrane had been shown to be the rate-limiting step in progesterone biosynthesis we focused our studies on regulation of this process. In general, PKA acutely stimulates progesterone biosynthesis while PKC activation has an inhibitory effect at several levels.

The final area currently being investigated is the role of luteal production of $PGF_{2\alpha}$ in normal luteolysis. If intraluteal secretion of $PGF_{2\alpha}$ is prevented, progesterone levels decrease to follicular phase levels but structural regression of the corpus luteum does not occur. The fact that intraluteal metabolism of $PGF_{2\alpha}$ occurs in luteal tissues on day 15 of pregnancy but not day 15 of the estrous cycle in ewes makes this observation more exciting. These studies are being followed up and completed at the present time.

The long-term associations with Dr. Terry Nett and Dr. Heywood Sawyer dramatically improved the training environment for students and fellows in Dr. Niswender's program. These associations added an exciting environment where critical evaluation of hypotheses to be tested, experimental methods and presentations occurred on a daily basis. The breadth of on-going research activities coupled with a high level of activity and cooperative interactions provided an excellent environment for scientific training. It goes without saying that the graduate students and postdoctoral fellows did most of the real work and should have been, collectively, the recipients of this award.