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• ÆÀÊö COMMENTARY •

¾Æ¾«ÐÔÖ¬·¾¸ÎµÄ¹ÜÀí

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ÕªÒª

½üÊ® 70 Äê¾í£¬ ... ¾Æ¾«ÐÔÖ¬·¾¸Î ... ¹ÜÀí ... ¡£

¹Ø¼ü´Ê: ¾Æ¾«; Ö¬·¾¸Î

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0 Òý ÑÔ

ÎÒ¹ú×÷Îª¾Æ¾«ÏûºÄ´ó¹ú ... ¾Æ¾«ÐÔ¸Î²¡ ... Õ¹(2002 Äê ...)£¬ ... [1]. ... [2-4]. ... ¡£

1 Á÷ÐÐ²¡Ñ§Ñо¿

1.1 ... ¾Æ¾«ÐÔÖ¬·¾¸Î ... 1 d ... 12 g ... 8%[5]. ... [6-10]. ... [11-12]. ... [13-15]. ...

1.2 ... ¡°U¡± ... ¡°J¡± ... Wei et al ... Q1(1-61.8 g/wk£¬5 ´Î/wkÒÔÏÂ)£¬Q2(61.9-122.7 g/wk£¬5-10 ´Î/wk)£¬Q3(122.8-276.6 g/wk£¬10-22 ´Î/wk)ºÍQ4×é(>276.6 g/wk£¬22 ´Î/wkÒÔÉÏ). ... Q2×é ... Q3¡¢Q4×é ... Q2×éµÄ2.2ºÍ2.4±¶£¬... Q1×é ... Q2×éµÄ1.8ºÍ1.4±¶. ... BMI¡¢Ñª ... HDL ... [16]. ... [17-19]£¬ ... BMI ... [20-22]. ... [23].

... ¾Æ¾«ÐÔÖ¬·¾¸Î ... J ... ¡£

2 ÊµÑéÑÐ¾¿

2.1 ¾Æ¾«¶ÔÌÇ´úÐ»µÄ¼±ÐÔ×÷ÓÃ ¾Æ¾«¶ÔÌ¼Ë®»¯ºÏÎï´úÐ» µÄÓ°ÏìÊÇ¸´ÔÓµÄ£¬ Ä¿Ç°»¹Ã»ÓÐÍêÈ«Ã÷°× .Ò»·½ÃæÓëÒÒ ´¼¼°Æä´úÐ»²úÎïÒÒÈ©ÓÐ¹Ø¡¢ ÒÒÈ©µÄ¼±ÐÔ×÷ÓÃÓÐ¹ØØ£¬ ÁíÒ»·½ ÃæÓëÒÒ´¼ÓÕµ¼Î¸ °ûÄÚ NADH/NAD$^+$±ÈÂÊÉý¸ßÓÐ¹Ø .¸Î¸ °ûÄÚµÄÎÑÇâÃ¸ÓÚ½«ÒÒ´¼´úÐ»Îª ÒÒÈ©¡¢ ÒÒÈ©¹ý³ÌÖÐ£¬ Ê¹ NADH(»¹ÔÐÍÑÌõ£°·¶þºËÜÕËá)µÄÉú³ÉÔö¶à£¬ NADH/ NAD$^+$µÄ±ÈÂÊÉÏÉý£¬ ²úÉú¹ýÁ¿µÄ H$^+$[24].NADH/NAD$^+$±ÈÂÊ µÄ Ä±ä¿ÉÒÔÓ°ÏìÐÂÃÂÈáÑ»·ºÍÖ¬·¾ËáµÄ β Ñõ»¯£¬ µ¼Ö ÒÔ¹Ù½øÌõÎªËá×ª»¯ÎªÈéËá .NADH/NAD$^+$ºÏÈéËá /±ûÍªËá ±ÈÂÊµÄÉý¸ß¿ÉÒÔÒÖÖÆÌÇÒìÉú .ÓÐÊÂÈë 48 g ¾Æ¾«ºó£¬ ¸Î ÔàµÄÌÇÒìÉú×÷ÓÃ¼µÍ 45%[25].Òý³ÆÇé¿öÏÂ£¬ ÑªÌÇ¼µÍ ÊÇ£¬ ¸ÎÌÇÔ¿ÉÒÔ·Ö½â³ÉÆÏÌÑÌÇÀ´Âú×ã»úÌåµÄÐèÒª£¬ ¶ø¾Æ¾«¿ÉÒÔÒÖÖÆÌÇÔµÄ·Ö½â . µ±ÉãÈëÒÒµÈ¼ÁÁ¿¾Æ¾« Ê±£¬ ¸ÎÔàÆÏÌÑÌÇµÄÊä³ö¼µÍ 12%£¬´ËÊ±¸ÎÌÇÔ´¢±¸ ³ä×ãÔò¾ÙÉÙ·¢ÉúµÍÑªÌÇ£¬ ¶øÌÇÔ´¢±¸Ñ·¦Ê±£¬ ½«Ð ·¨Î¬³ÖÕý³£ÑªÌÇ®Æ¶ø·¢ÉúµÍÑªÌÇ .ÕâÖÖÌÇÔ´¢±¸ºÄ ½ß²»½ö¼ûÓÚÓªÑø²»Á¼µÄÐï¾ÆÕß£¬ »¹³£¼ûÓÚµÍÌ¼Ë®»¯ ºÏÎïÒûÊ³ºÍ¿Õ¸¹ÒûÎ¾Æµ ÄÈËÇ [26].

ÁíÒ»ÖÖÀàÐÍµÄµÍÑªÌÇ±»ÈÏÎªÊÇ¾Æ¾«×÷ÓÃºóµÄ·´Ó¦ ÐÔµÍÑªÌÇ .ÉãÈë¸»º¬ÌÇ¼Ë®»¯ºÏÎïÐû³Ì³ÊÎÒÔÚ¾ÆÊ£¬ Ñª ÌÇË®Æ½µÄÉý¸ß¿ÉÒÔÃ¹ý·Ö¿ÉÄÜµÄÒÈµºËØ·´Ó¦¶ø·¢ÉúµÍ ÑªÌÇ£¬ Õâ¸ö÷Òª·¢ÉúÔÚº¯ 2-3 h[27].Õâ¸öÏÖÏóÌáÊ¾¾Æ ¾«¶ÔÒÈµº β Ï¸°û¿ÉÄÜÓÐÔ´Ì¼¤×÷ÓÃ .¾²Âö¸øÓèÆÏÌÑÌÇ ºÍ¾Æ¾«£¬ ·¢ÏÖ¾Æ¾«Ê×ÏÈÑõ»¯¹©ÄÜ£¬ Õâ¸ö³É¿¨Ê½Ê±ÆÏÌÑ ÌÇµÄÀûÓÃ¼µÍ¶ÔµÍÓÃ¸ßÑªÌÇºÍ¸ßÒÈµºËØÑªÖ¢ [28-29].¾Æ ¾«ÓÐÖú¼µÄ·´Ó¦ÐÔµÍÑªÌÇÓÐºÜ´ó³Ì¶È»¹ÓëÉãÈë¡µÄÌ¼Ë®»¯ ºÏÎïÖÖÀàÓÐ¹Ø [30].Òò´Ë£¬ ¾Æ¾«¿ÉÒÔÒÖÖÆÆÏÌÑÌÇµÄÀûÓ Ã£¬ ¶øÌ¼Ë®»¯ºÏÎïÖÖÀàÓëÑªÌÇÉý¸ßµÄËÙ¶ÈºÍ³Ì¶ÈÓÐ ¹Ø£¬ ½ø¶ø¶ÔÒÈµºËØ·Ö·´Ó¦ .µ«ÊÇÒ»Ð©ÑÐ¾¿²¢Ã»ÓÐ·¢ÏÖÊ³¾ ¾Æ¾«×÷ÓÃºóÒÈµºËØ»ò C- ëÄÊ®Ë®Æ½Éý¸ß£¬ ¶øÇÒÕý³£ÈËÈºÍ ·ÇÒÈµºËØÒÀÀµÐÍ»¼ÕßµÄ±íÏÖ»¹ÓÐ [31-32].

2.2 ³¤ÆÚ¾Æ¾«×÷ÓÃ¶ÔÒÈµºº½á¹¹¡¢ ¹¦ÄÜµÄÓ°Ïì

2.2.1 ¾Æ¾«¶ÔÒÈµºÐÎÌ¬½á¹¹µÄÓ°Ïì ³¤ÆÚ¹ýÁ¿¾Æ¾«ÉãÈë ¿ÉÒÔµ¼ÖÂ´óÊóÒÈµºµÄÐÎÌ¬½á¹¹·¢Éú¸Ä±ä .ÎÒÃÇ¼ÆÁµÄ ÑÐ¾¿½á¹ûÏÔÊ¾ 50% ¾Æ¾«¹àÎ¸×é´óÊó£¬ ÒÈµºÑÕÉ«¿Ï¸°û (β Ï¸°û)Ìå»ýÔö´ó£¬ ¶àÊýÏ¸°ûÇÊ³ÊÊèËÉÍ×´£¬ Ï¸ °ûÅÅÁÐÃ÷ÏÔÎÉÂÒ£¬ ÁºËÈ½äµÄÅ¾Ï¶Ñª¹Ü³Ã÷ÏÔ±äÕ¡£¬ ÓÐ Ð©´¦¹ÓÐ¼ûºÕ±ÕÊµÄ×´Ì¬ .Koko µÄÑÐ¾¿Ê¹ÃÖÃÿÐÔ¾Æ¾«ÖÐ ¶¾µÄ´óÊó×ÜÒÈµºÌå»ý½µµÍ¡¢ β Ï¸°ûµÄÊý¼¶¡¢ ±íÃæ»ý¡¢ Ìå»ý¼° β Ï¸°ûºËµÄ¼õÉÙ£¬ β Ï¸°ûµÄºËÄ¤²»¹æÔòµØº¼ ÏÖ¢ Ï¸°û±ß¾ç³öÏÖÒÌ³Æ«ÔÊÔÓ¼ºÏ¸°ûÄÚæÔÚÍ¶Ïà¿Õ¿Å ÁÆ»òÃ»ÓÐÇåÎúµÄÒÈµºÏÖÂÃÙ½ã¾§µ¿ÅÁ£ [33].

2.2.2 ¾Æ¾«¶ÔÑªÌÇ¡¢ ÒÈµºËØÓ°Ïì ÒÈµºËØÐÎÌ¬½á¹¹ µÄ ±ä»¯½«Ó°ÏìµÄÒÈµºµÄ¹¦ÄÜ .ÑªÌÇ¡¢ ÑªÒÈµºËØË®Æ½ ·´ β Ï¸°û¹¦ÄÜµÄÖØÒªÖ¸±ê [34].ÎÒÃÇµÄ¶¯ÎïÊµÑéÑÐ¾¿·¢ ÏÖ³¤ÆÚ¹ýÁ¿¾Æ¾«ÉãÈë¿ÉÒÔµ¼ÖÂ´ÓÑÌÇÉý¸ß¡¢ ÐÛ´óÊó¿ÕÕ¸¹ÑªÌÇË®Æ½Éý ¸ß£¬ ÌÇÄÍÁ¿Òì³£¡£ ¶øÑªÇåÒÈµºËØ®Æ½Ë¨Ì¼ÎÞ¸Ä±ä [35-37].ÎÒ ÃÇÈ¥¹×ÇµÄ´ÓÊÔÑéµÄÒÈµº½á¹¹²ÎÊýÃÓÊ¾×ÑÒ»ÑÐ·¢ÏÖ½á¹ûÒ² ÌáÊ¾³¤ÆÚ¸ßÁ¿¾Æ¾«×÷ÓÃÎÄÒÈµº β Ï¸°ûÎ³ÉÒÈµºËØÓ°µÄ ÄÜÁ¦¼µÍ£¬ ±íÏÖÎªÒÈµºËØ·ÖÃÚ½µÉÙ [36].ÓÃ½üÆÚµÄÏ¸°û ÑÐÑÐ¾¿ÖÐ£¬ ÎÒÃÇÓÃ²»Í¬¼ÁÁ¿¾Æ¾« (0£¬50£¬100£¬200£¬ 400 mmol/L)×÷ÓÃÓÚ NIT-1(×ª»¯ÊóÐÍÒÈµºÏ¸°û β Ï¸°ûÖê)Ï¸ °û6£¬12£¬24 h£¬·¢ÏÖ¾Æ¾«¶Ô NIT-1 ´úÐ»»îÐÔµÄÓ°ÏìÓë¾Æ ¾«×÷ÓÃÊ±¼ä¡¢ ×÷ÓÃ¼ÁÁ¿ÓÐ¹Ø£¬ ¾Æ¾«¶ÌÊ±¼ä (6 h)×÷ÓÃÊ± ÒÖÖÆÓÐÐ§ÒÈµºËØ·ÖÃÚ£¬ ³¤Ê±¼ä (12£¬24 h)×÷ÓÃÒÖÖÆÒÈµºËØ ·ÖÃÚ ;µÍ¼ÁÁ¿¶ÔÒÈµºËØ·ÖÃÚÓÐ°Ï¡²»Ã÷ÏÔ£¬ ¸ß¼ÁÁ¿ÒÖÖÆÒÈµºËØ ËØ·ÖÃÚ£¬ ¾Æ¾«×÷ÓÃÐÔ÷ÏÔµÄÊ±¼ä¡¼ÁÁ¿ÒÀÀµ¹Ø Ïµ.

Æä»úÖÆÓëÖ½Ð§ÑÐ¾¿Ê±±£¬ ÓÐµÄ¼½á¹ûÏÔÊ¾¾Æ¾«ÒÖÖÆ ÆÏÌÑÌÇ´Ì¼¤µÄÒÈµºËØ·ÖÃÚ [38]£¬¶øÓÐµÄÑÐ¾¿½á¹û´ËÎÒ Ê¾¾Æ¾«´Ù½øÆÏÌÑÌÇ´Ì¼¤µÄÒÈµºËØ·ÖÃÚ [39-40]£¬»¹ÓÐ µÄ·¢ÏÖ¶ÔÓÚÌåÍâÅàÑøµÄÒÈµº β Ï¸°û (HIT-T15)£¬ÒÈµº ËØµÄ»ú´¡·ÖÃÚ±»¾Æ¾«ÒÖÖÆÁË 30%£¬¶øÆÏÌÑÌÇ´Ì¼¤µÄÒÈ µºËØ·ÖÃÚ²¢Ã»ÓÐ±»¾Æ¾«ÒÖÖÆ [41].ÕâÐ©²»Í¬µÄÊµÑé½á¹û ¿ÉÄÜÓë²»Í¬ÊµÑéµ²ÉÈ¡µÄ¾Æ¾«Å¨¶È¡¢ ÊµÑéÊ±¼ä³¤¶ÌµÈ ÒÔ¼°ÓÐ¹Ø .

2.2.3 ³¤ÆÚ¾Æ¾«ÉãÈë¶ÔÒÈµº½á¹¹ºÍ¹¦ÄÜÓ°ÏìµÄ»úÖÆ ÎÒ ÃÇÈÏÎª¿ÉÄÜÓëÒÔÏÂÒòËØÓÐ¹Ø :(1)¾Æ¾«¶ÔÌÇ½Í½âÃ¸¶¾ÐØ ¼üÃ¸»îÐÔµÄÓ°Ïì¼Í½â·´Ó¦¹ý³ÌÖÐ´æÔÚÈý¸ö¹Ø¼üÃ¸£¬ ÆÏÌÑÌÇ¼¤Ã¸ (GK)»ò¼º¹ÌÇ¼¤Ã¸ (HK)¡¢Á×Ëá¹ûÌÇ¼¤Ã¸ (PFK)ºÍ±ûÍªËá¼¤Ã¸ (PK)£¬ÆäÖÐ×îÖØÒªµÄÊÇ PFK.GK ÊÇHK ½Ó×ÅÓÐµÄÒ»ÖÖ£¬ ËüÌØÒìÐÔ´æÔÚÓÚ³ÉÊì¸ÎÏ¸°ûºÍ ÒÈµº β Ï¸°ûÐ .ÓÉÓÚÆÏÌÑÌÇ´úÐ»ÓëÒÈµºËØ·ÖÃÚÏàñî ÆÃ£¬ GK »îÐÔ¾ö¶¨ÁËÌÇ´úÐ»ºÍÒÈµºËØ·ÖÃÚµÄ·ùÏ¶£¬ ÔÚ Î¬³ÖÑªÌÇÎÈÌ¬¹ý³ÌÖÐ·¢»ÓÖØÒª×÷ÓÃ .ÎÒÃÇÑÐ¾¿·¢ÏÖ ³¤ÆÚ¹ýÁ¿¾Æ¾«ÉãÈë¿ÉÊ¹ GK ºÍPFK»îÐÔÃ÷ÏÔÏÂ½µ£¬ÒÖÖÆÆ£¬ ÇÒÓë¾Æ¾«¼ÁÁ¿³ÊÏÔÖø¸ºÏà¹ØØ [42]£¬¶øÇÒ¾Æ¾«»¹¿ÉÊ¹ NIT-1 Ï¸°ûÐ GK mRNA µÄ±í´ï¼µÍ .Òò´Ë£¬ ¶ÔÌÇ½Í½â Í¾¾¶¹Ø¼üÃ¸µÄÓ°Ïì¿ÉÄÜÊÇ¾Æ¾«Éý¸ßÑªÌÇ£¬ Ê¹ÑªÌÇµ÷ ¼Ú»úÖÆÊ§ÈÁÐ£¬ ½ø¶øµ¼ÖÂÌÇÄò²¡µÄ»úÖÆÖ®Ò» .(2)Ñõ»¯ Ó¦¼¤Í¾¾¶ÕÒý³ÆÇé¿öÏÂ£¬ »úÌåÄÚ»îÐÔÑõ (reactive oxygen species£¬ROS)²úÉúÓë ROS Çå³ý´¦ÓÚ¶¯Ì¬Æ½ºâ£¬ Æ½ºâ±»´òÆÆµ¼ÖÂ»úÌåÑõ»¯Ó¦¼¤ (oxidative stress)Ëð ÉË.¾Æ¾«ÊÇÒ»ÖÖÇ¿ÑôÏ¸°ûÄÚÑõ»¯Ó¦¼¤µÄ´Ù±íÐÔÎïÖÊ .ÎÒ ÃÇµÄÕûÌå¶¯ÎïÊµÑéÐÐ·¢ÏÖ¾Æ¾«¿ÉÊ¹ÒÈµº´óÊóÒÈµºÎ»Ñõ»¯¿¹ Ñõ»¯Ê§ºâ£¬ 50% ¾Æ¾«¼ÁÁ¿×é´óÊóÆÛ´óÊóÒÈµº×éÓÐ ÓÐµÄ×Ü ³¬Ñõ»¯ÎïÆç»¯Ã¸ (T-SOD)½µµÍ£¬ NO¡¢Ðò»îÐÔÑõ¼°±ûÈ©ÖÐ ÈÈ©(MDA)º¬Á¿Éý¸ß [36].ÓÉÓÚÒÈµºÏ¸°ûÇ¿»¯ºÏ·ÖÃÚÏÂ£¬ ¾Æ¾« ÊÇ·ñ¶ÔÆä·ÖÃÚÏÂÒÈµºÉúº£¬ ÓÈÆäÊÇÒÈµº β Ï¸°ûÒ²Ó°ÏìÑõ»¯ Ó¦¼¤ËðÉËÊÇÎÒÃÇ¹Ø×¢µÄÎÊÌâ .ÎÒÃÇµÄÏ¸°ûÊµÑé½á¹ûÏÔÊ¾£¬ ÓÃ¾Æ¾«×÷ÓÃ 24 h ºó£¬ Ëæ×Å¾Æ¾«¼ÁÁ¿µÄÉý¸ß£¬ NIT-1 Ï¸°û MDA º¬Á¿Éý¸ß£¬ SOD¡¢GSH-Px »îÐÔ ÏÂ½µ£¬ GSH

Caspase-3 Caspase-3 NIT-1 Caspase-3 NIT-1 Caspase-3 NIT-1 Caspases [43] Caspase-3 Caspase Caspase-3 [44] [45] Caspase-3 NIT-1 Caspases Caspase-3 [48-50] IRS-1mRNA DNA (PCNA) (GAPDH) (MAPK) IRS-1 (IRS-1) (3) TNF-α IL-1β IL-6 [37] SH2 (PI3-kinase) (IRS) [46-47] [51]

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