SUMMARY

1) In the first part of this investigation, an adequate collection of solvent systems and colour reagents for the resolution and identification of different C-19 and C-21 steroids was selected.

2) 147 local fungal isolates, which belong to 11 species and 5 genera of order Mucorales, were tested for their ability of transformation of progesterone to its hydroxy derivatives.

3) Only six isolates achieved and oxidative splitting of the side chain of progesterone in position C-17 with the formation of Δ^4-androsterone-3,17-dione → testosterone → testolactone as the final steroid product. These isolates belong to Circinella muscae (3 isolates) and M. circinelloides (3 isolates) both of family Mucoraceae.

4) In the remaining 141 isolates of Mucorales, hydroxylation at C-11 was achieved either at site 11 α-only or at both sites 11 α-and 11β. None of them could hydroxylate the steroid molecule at site 11β-only.

5) 11β-Hydroxylation frequently occurred in case of Absidia (Fam. Mucoraceae) and Cunninghamella (Fam. Choanephoraceae).

6) The isolates Rhizopus (70 isolates) could be divided into two groups:

a- The first group, comprising 22 isolates of R. oryzae which could transform progesterone to 11 ∝ -hydroxyprogesterone as single and final end product.

b- The second group comprising one isolate of R. nodosus and 47 isolates of R. stoloniferum (nigricans) which could transform progesterone to 11 ∝-hydroxyprogesterone, which was further transformed to a second end product 6B, 11 ∝ -dihydroxyprogesterone.

7) All isolates of Mucor griseo-cyanus (3 isolates) were characterised by a unique type of hydroxylation, leading to the production of 14 ∝ -hydroxyprogesterone.

8) Mucor racemosus (18 isolates) and M. hiemalis (28 isolates) were similar in the aspect of the production of 11 ∝ -hydroxy in addition to 11 ∝ , 17 ∝ -dihydroxyprogesterone, but were different in some aspects as all isolates of M. hiemalis gave rise to 21-hydroxyprogesterone whereas all isolates of M. racemosus could convert 11 ∝ -hydroxyprogesterone into 11 ∝ -allopregnane-3, 20-dione.

9) All isolates of C. elegans (6 isolates) and C. echinulata (13 isolates) both of family Choanephoraceae, gave 11 ∝ -hydroxylation alone or combined with 11B-hydroxylation. The only difference was that all isolates belonging to C. elegans gave 6β, 11 ∝ -dihydroxyprogesterone; a reaction

which was performed by some, but not all, isolates of C. echinulata.

10) C. echinulata (isolate No. 77) was the most active isolate, therefore was selected for further experiments.

a- The maximum production of 17 ∝ -hydroxyprogesternne was estimated: after 48 hours incubation; at pH.6.5; and in presence of 2 gm/ litre phosphate.

b- Acetate and fumarate were favourable for production 17 ∝ -hydroxyprogesterone.

c- Olive oil stimulated 17 ∝ -hydroxylation as, cotton seed oil stimulated 11 ∝ -and 17 ∝ -hydroxylation and castor oil promoted 11 ∝ -hydroxylation with no significant effect on 17 ∝ -hydroxylation.

d- Tween 80 supported the highest production of 17 ∝ -hydroxyprogesterone among all tweens used.

e- All water-soluble alcohols used, inhibited the production of both 11 ∝ - and 17 ∝ -hydroxylation, except t-butyl which stimulate 17 ∝ -hydroxylation.

f- By using C. echinulata (isolate No. 77) and a laboratory fermentor, 20 gm of added progesterone per 2 litres culture medium yielded 17 ∝ -hydroxyprogesterone

(40.40 %), 11 ∝ -hydroxyprogesterone (23.65 %) and 11 ∝ , 17 ∝ -dihydroxyprogesterone (20.35 %).

g- C. echinulata (isolate No. 77) is thus strongly recommended for the technical production of 17 ∝ -hydroxyprogesterone.